Developments in Colorants for Plastics

Ian N. Christensen

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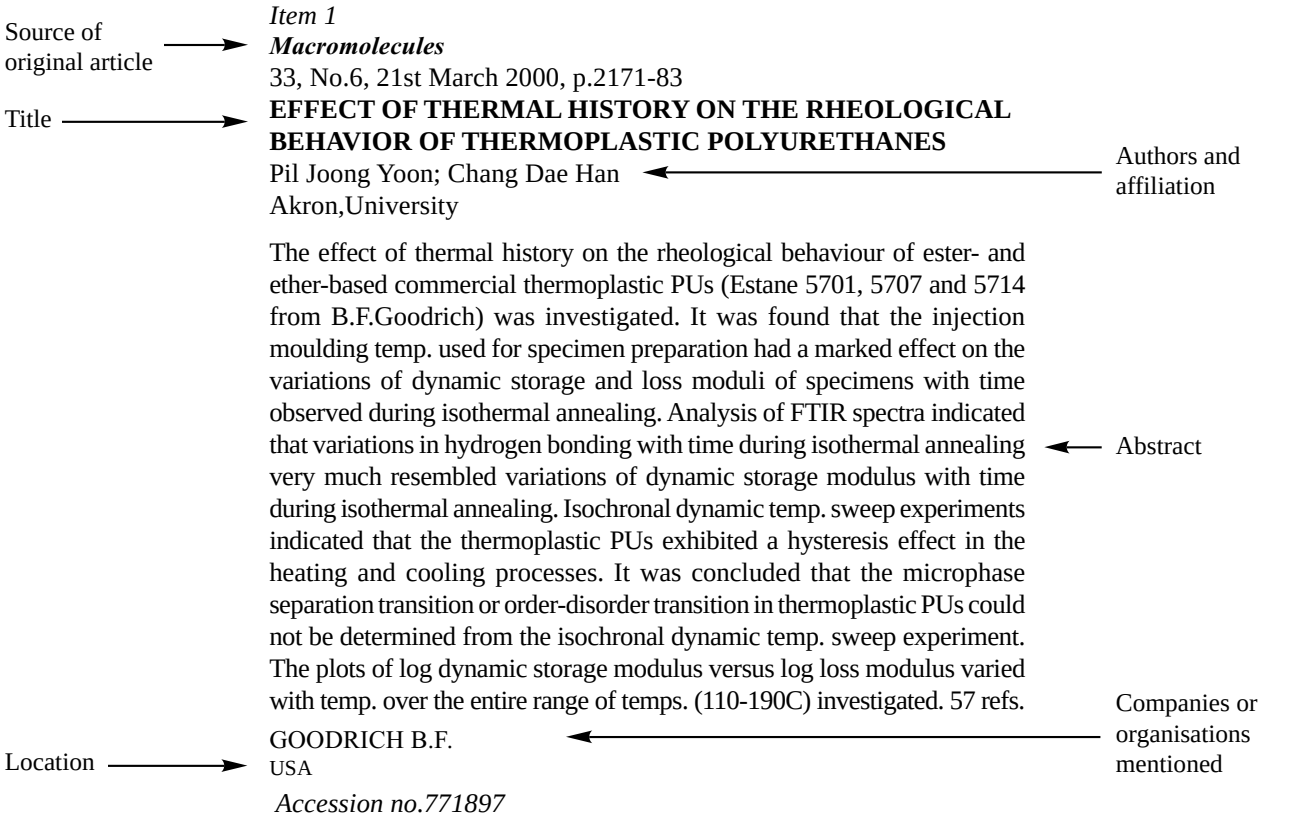

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Contents

1 Introduction (59, 71, 74, 99, 436, a.1-a.3)

Plastics are the dominant material of the 21st century and with their expanding usage has come ever-stronger demands for dynamic colours and visual effects to attract customers and differentiate products. Those demands have been well met by the chemical industry through the creation of a dazzling array of over a thousand different types of pigments and dyes. However, with progressive maturation of various industry segments the deluge of new colorants has diminished to a trickle. This paper reviews and identifies the colorants that now form the backbone of the industry palette. Although the rate of introduction of new chemistries has slowed, it certainly has not stopped with new products continuing to be released into nearly all segments. Recent introductions are described in every area from the highly competitive yellow segment through to the very stable blue segment. Current trends in colouration are identified and discussed.

Colour has always been an important factor in supporting the sales of plastic products and in the highly competitive retail markets of the 21st century it continues to play a critical role. Producers of plastic items can impart colour to their products in a variety of ways. The main method is 'through-colouration' in which the whole polymer mass is coloured prior to being formed into its final shape. A relatively recent variant of this basic method is the trend to fabricate parts from multiple co-produced layers, but with colouration present only in the outer most layer (20). Alternatively plastic parts can be surface decorated by a variety of techniques. The simplest of these are painting and printing. Recent developments in the techniques of in-mould labelling and in-mould painting can be treated from a colouration viewpoint as additional techniques for surface application of colour to the object (19).

Painting tends to be expensive due to the intrinsic need for an additional post formation production step, and so is usually applied only in special circumstances such as the matching of plastic surfaces with other painted surfaces, or the desire for certain visual effects that are only possible through painting techniques. Through colouration is still the most common approach and forms the main focus of this review. From a colouration perspective multi-layer structures have the same technical requirements as full through colouration and so colouration of such co-injected or co-extruded skins can be treated in the same discussion as through colouration.

The infinite variety of shades that are called for in plastics colouration, demands a formulation approach to colour production with the final colour being generated from a combination of input colours. The subject of developing formulations to reach a desired target colour is a large one and is beyond the scope of this article. Instead this review will focus on the range of colorants that most formulators have settled on as their preferred set, and will look at current trends and recent developments in this sector. This study will examine the three primary and three secondary colours yellow, orange, red, magenta/violet, blue and green. We will also address briefly a variety of special effect colorants which do not fall into the conventional colour categories but which make an important contribution to the plastic colouration industry. Black and white are also important parts of the colourist's palette, but the product and application technology for these non-chromatic colorants are relatively specialised and deserve separate treatment.

The majority of colouration of plastics is covered by this direct chromatic approach, however, as stated earlier, the main reasons for applying colouration are visual impact and aesthetic appeal. In this respect a review of colouration would not be complete without an acknowledgment of the role and impact that special effect colorants have in the creation of novel visual effects. As well as being interesting in their own right they can usually be used in combination with conventional pigments and so add additional dimensions to colouring possibilities.

This review is also focussed on the main thermoplastics: polyvinyl chloride, polyolefins, styrenics, and engineering resins, and the main plastic shaping techniques: injection moulding, roto-moulding, extrusion, casting, thick and thin section moulding and blown film. The notable exclusion is mass colouration of synthetic fibres. Many of the observations made about the colouring of plastics also apply to such fibre applications, however, the higher colorant loadings and demanding processing conditions tend to set a higher performance hurdle that excludes or limits the use of a number of the colorants that are recommended for plastics. Additionally the colour emphasis for mass coloured fibre is different from plastics and this leads to a somewhat different palette for common usage.

1.1 Definitions

Colouration is an industry where everyone sees your mistakes. In colouration everyone has an opinion, every customer is an 'expert', and even if they have no

technical knowledge of the subject whatsoever, their purchasing decision provides the final arbitration on acceptability. Therefore this review is based on the colours themselves: yellow, orange, red, magenta/purple, blue and green, the six primary and secondary colours. Defining and describing colours has its own language and complications (74), but for simplicity this paper will use the chroma, hue (C, h) co-ordinate system to describe colours. In this system the shade of colour (the hue) is described by an angle on a colour circle; red, orange, yellow, green, blue, violet, maroon. The boundaries between these major colour groups are somewhat arbitrary, in that a colour that appears to one person as a yellowish orange could equally be described by someone else as a reddish yellow. For this paper

Colour	Hue angle range
Red	0-35
Orange	35-60
Yellow	60-120
Green	120-210
Blue	210-295
Maroon/Violet	295-360

The chroma is the intensity of the colour and corresponds to the distance from the colourless (grey) centre of the colour circle towards the intensely coloured outer edge. The chroma scale in this CIE LCH system varies from 0 to 100, where 0 is at the centre and 100 is at the periphery, but it is important to note that the maximum possible chroma varies with the hue. A colour with a chroma value of 70 would be dramatically intense. For completeness this model places pastel shades in the space 'above' the plane of the colour circle fading to white at the top, and dark (blackened) shades lie 'below;' the plane of the circle tending to black at the bottom.

For a comparison of colorants that includes an economic dimension it is necessary to have an indication of relative strength. This is a measure that indicates the relative amounts of different pigments that are required to produce similar visual results. For simplicity the observations in this paper are built around comparisons of pigment loadings (manufacturers' claims) required to achieve '1/3 Standard Depth'. This is a defined, middle strength depth of shade, created with a given loading of titanium dioxide and is exemplified by many 'mid strength' colours seen in shampoo and detergent bottles. (For more details see DIN Method 53235 (a.4).) A high number (say 0.5% colorant in combination with 1% TiO_2) indicates that a relatively large mass of pigment is required to achieve the target depth of colour and implies that the colorant is relatively weak and conversely a low number (say 0.05% colorant) indicates high strength. 1/3 Standard Depth is not a perfect yardstick as it does not control for dispersion quality or pigment particle comminution during mixing and it suffers from non-linearity in the relationship between colour strength and pigment loading. Consequently, comparisons of pigments based on Standard Depth figures must be interpreted with care. For very intense or very pale shades it is recommended that colorant comparisons be made in the intended colour, as the 1/3 Standard Depth (SD) values may not be accurate or relevant at these extremes.

A third area of definition that is required to ensure common understanding is nomenclature. All commercially available colorants can be classified according to their chemistry and this is organised on a global basis by the Society of Dyers and Colourists through the Colour Index system (www.colour-index.org) (188). The Colour Index (CI) system theoretically makes it possible to discuss the performance of a particular chemical class of pigments (for example dimethyl quinacridone = Pigment Red 122, or carbazole violet = Pigment Violet 23) regardless of the manufacturer. For a broad-brush discussion of the major components of the modern plastic colouration palette this is adequate, but this cannot be extended to an assumption that all products in a particular CI classification will deliver identical behaviour. They will not. The Colour Index is useful for characterising chemistries but it takes no account of particle size distributions or surface treatments. These factors have a major influence on colour strength, heat resistance and dispersability, so along these dimensions at least, colorants with the same Colour Index but from different manufacturers are likely to perform very differently.

1.2 Pigments versus Dyes

Both the soluble dyes and the insoluble pigments play important roles in plastics colouration (74, 71). In the colouration of many grades of styrenic and engineering plastics both types of colorant can be used and so, to some degree compete against each other. In this context it is important to understand the inherent features of both types to appreciate the impact of new products in either area. The relative features of dyes and pigments are summarised in **Table 1**.

Table 1 Relative features of pigments and dyes	
Pigments	**Dyes**
• seldom fully transparent • weaker • generally superior heat stability and durability • more difficult to disperse • non migrating • can be difficult to achieve high colorant loadings and strong depths of shade in some circumstances	• highly transparent • strong bright colours • widely varying heat and light stability • easier to disperse • not suitable for polyolefins • require more 'sophisticated' handling to control dose rates and prevent cross contamination • high 'per kilo' costs

Despite the 'sticker shock' arising from the high unit costs of many polymer dyes, in most situations their higher colour strength can generate a given shade more cost effectively than can be achieved with pigments. Unfortunately, however, their lack of chemical affinity with polyolefins and PVC cause major and unacceptable migration problems that effectively preclude them from application in these polymer groups. The polar nature of many of the engineering resins serves to 'bind' the dyes into the polymer matrix and this frequently generates fully acceptable (non)migration behaviour. However there is a problem in many engineering resin applications due to the high temperatures at which these polymers are processed. Dyes are generally less heat stable than pigments and so despite their economic attractiveness, relatively few have the capability to survive the higher processing temperatures (280-300 °C) of the engineering resins. (Many pigments derive an additional degree of stability from their crystal structure. By contrast, dyes dispersed and dissolved in a polymer exist as discrete molecules that are more vulnerable to degradation.)

The solubility difference also leads to considerable differences in processing behaviour, particularly in the preparation of masterbatches or colour concentrates. Achieving a good dispersion of a dye in a polymer has some similarities to adding sugar to a cup of tea. It may not dissolve instantly but an acceptable result can usually be achieved relatively quickly given an appropriate amount of stirring at a high enough temperature. Adding pigments, on the other hand, is more like the addition of flour to water in the preparation of dough or batter. To get the flour mixed evenly into the water with no residual lumps requires an extended beating process that takes considerable shear and energy. Temperature plays a role through the viscosity of the polymer, but does not have the same impact as it does in the dissolution of dyes. Overall dyes are considerably easier to incorporate into polymers than pigments.

However, the great strength and high solubility of dyes generate their own challenges, as a very little dye can still have a significant impact on the final colour. Consequently the weighing and dosing of dyes has to be done with substantially greater accuracy than for pigments, and equipment cleaning and dust extraction must be maintained at a scrupulously high standard to prevent cross contamination. Tight control is also needed at the final plastic processing step as colour concentrates based on dyes frequently deliver more colour per kilo and so require lower and more accurate dosing rates to achieve the same level of colour variation control.

The final major difference between dyes and pigments that influences their scope of application is transparency. Dyes, being soluble, are fully transparent whereas very few pigments could make the same claim. Thus dyes are well suited to applications such as windows and lenses formed from transparent styrenic or engineering polymers. Conversely pigments are well suited to translucent or opaque polyolefin and PVC applications, but the other two options, opaque engineering resins and highly transparent polyolefins present more significant colouring challenges.

The different performance profiles of dyes and pigments has a significant impact on processing behaviour and an appreciation of these differences gives considerable aid to the plastics processor. All polymer dyes are chemical compounds consisting of relatively small molecules prepared typically through the techniques of organic chemistry. By contrast pigments are a much more diverse group.

1.3 Organic versus Inorganic

Pigment chemistry is a large technical subject in its own right and beyond the scope of this paper, however

an overview of the main classes is useful to appreciate the impact of some of the new developments (74).

All pigments used by the plastics industry are particulate and mostly crystalline materials and these days all are man-made. Within that group, however, some are described as organic (as they are created by processes of organic chemistry), some are described as inorganic (as they are based on 'inorganic chemistry' and typically have characteristics similar to minerals), some are called metallic (because they consist of minute metal flakes) and many of the special effect pigments (pearlescent, interference, iridescent, etc.) are principally inorganic, but are put into a category of their own because of their very different visual properties and manufacturing processes.

Clearly the end user of these pigments is mostly focussed on achieving a desired colour or visual effect and the process used to manufacture the pigment is relatively unimportant, but to evaluate recent developments requires an understanding of the features and constraints of the available pigment technologies. **Table 2** compares the features of organic and inorganic pigments. (Metallic and special effect pigments are described separately in a later section.)

Much of the recent development in pigments for plastics has been in the organic area and has arisen through the dramatic growth of chemical technology over the last 100, and especially the last 50 years. This has created an extensive palette of strong, bright, stable colorants that has expanded the available colour space. This expansion of product ranges, combined with increased opposition to the use of 'heavy metals' has caused a slow expansion of organic pigments into many of the colouring applications previously supplied by inorganic pigments. In response the inorganic pigment producers have focussed on the major contributions of inorganic pigments (particularly opacity, and heat, light and weather stability) and have subsequently dominated outdoor applications demanding high durability. Thus the two types of pigment, organic and inorganic, play complementary roles.

1.4 Environmental and Occupational Health and Safety (OHS) Issues (79, 150, 159, 189, 196, 257, 351, 434, 435)

Awareness of, and action over environmental, health and safety issues has been a feature of social politics for several decades now and this has had a significant influence on the colouring of plastics. Although many of the issues overlap they can be broadly grouped into three main areas: toxicity issues, material handling issues and migration/contamination issues.

Toxicity issues, which include the debates over heavy metals, diarylides, and more recently smoke toxicity have had the largest effect. Despite the absence of direct evidence of plastic colorants causing harm, these social and political trends have had major effects on the acceptability of some types of products. As will be discussed in more detail in the individual colour areas, the resulting widespread 'disfavour' toward lead, cadmium and diarylide pigments has created substantial opportunity and incentive for new product development.

The environmentally friendly trend is most directly articulated by the European and North American regulatory stances against the use of lead and cadmium pigments (150, 189). In recent years there have been fewer articles and less discussion than during the middle of the last decade, but the overall trend seems still to be towards a continuing slow reduction in the usage of pigments based on heavy metals.

Table 2 Features of organic and inorganic pigments

Organic	Inorganic
• Wide range of heat and light stability performances	• Most have very high heat stability
• Generally bright, intense colours	• High light stability (resistance to fading)
• High colour strength (colour effect per kilo)	• Many (but not all) have relatively dull shades
• Generally high 'per kilo' costs	• Low colour strength (colour effect per kilo)
• Mostly translucent (few transparent, few opaque)	• Generally low 'per kilo' cost
• Generally difficult to disperse	• Most have high opacity
	• Generally easy to disperse
	• Some contain 'heavy metals'

In some more specialised areas (e.g., building and cabling) there are also growing restrictions on the use of halogenated materials and in the area of beverage packaging there is increasing focus on prevention of taste and odour contamination (particularly of bottled water) which will impact colorant choice among other things.

Material handling issues cannot be divorced from toxicity issues as extra care and cost will be required to handle colourants that are potentially toxic or injurious, but the purpose of separating material handling issues is to recognise the widespread pressure being felt throughout the economically developed countries to provide cleaner, safer workplaces. In circumstances of high and rising living standards, and especially in times of high employment, it becomes increasingly difficult to attract and retain staff in dusty, dirty jobs. Thus there is ongoing pressure for colourants with lower dusting, easier handling, freer flowing, more easily meterable characteristics.

Migration of colourants (or their components) and contamination of drinks and foodstuffs also have an aspect of toxicity, but in this area now, the main issues are the progressive tightening of the acceptable limits of migration. In the main part toxic materials and excessive colourant migration have been eliminated from plastic colouration practice, but down at the 'parts per million' level the debates continue. The tougher performance requirements have arisen partly through the actions of the regulatory authorities such as the US Food and Drug Administration (FDA), but also by individual companies who have recognised the damage that a product contamination issue can cause to a brand reputation. Several incidents in the bottled water and beverage industry have given significant impetus to demands for higher purity, lower migration and avoidance of taint contamination. As this places higher demands on colourant manufacturing processes, it adds some cost and it tends to benefit the better-organised colourant producers at the expense of those with lower levels of process control.

1.5 Decision Factors in Selecting Colorants

There are numerous discussions in the literature regarding the parameters involved in the process of colorant selection (67, 71, 74, 436). Over the past decade this dialogue has intensified as economic pressures on the industry have forced the colorant chain, from colorant manufacturers through masterbatchers to plastics processors, (and even in some cases to the part designers and specifiers) to adopt a 'right fitting' approach (307, 240, 145). This term is used to refer to the establishment, for each application, of a clear understanding of the minimum performance required in each performance dimension, and selection of the lowest priced colourant(s) that will provide just sufficient performance to do the job.

Typical performance dimensions include:

Basic requirements (present in all applications)

- Colour (hue*, chroma*, lightness, opacity and batch to batch consistency)
  (* alternatively redness/greenness, yellowness/blueness)
- Polymer compatibility (more of an issue for engineering resins)
- Heat stability (in particular the ability to withstand the polymer processing conditions)
- Processing ease (colorant dispersability in the polymer matrix)
- Handling (tendency to create dust, ease of powder flow)
- Economic efficiency (colour strength, processing ease, batch to batch variability)

End use requirements (vary considerably from one situation to another)

- Migration resistance
- Suitability for food contact applications
- Regulatory compliance
- Light resistance
- Weather resistance
- Warping tendency
- Heavy metal content
- Halogen content
- Organoleptic properties
- Electrical properties
- Absorption or reflection of specific wavelengths
- Solvent and chemical resistance, etc.

With at least fifteen independent dimensions of colorant performance it can become a difficult and complex

exercise to make full comparisons even between pigments of the same nominal chemistry from different suppliers, let alone between different chemistries with similar hues. For the purpose of this review some grouping together was required and this has been done on the basis of colour, then of heat resistance, and in some cases light fastness as well. This rough sorting risks some misaligned comparisons, but accords fairly closely with industrial practice. Although the huge diversity of plastics applications means an almost infinite variety of possible process conditions, in practice they can mostly be grouped into low temperature processes (170-220 °C), mid temperature processes (230-270 °C) and high temperature processes (280-320 °C). Similarly, light fastness requirements can be grouped into the three categories: 'minimal' for applications that have very short lives or are seldom exposed to light, 'medium' for the majority of applications, or 'high' for all long life plastic products. Therefore on these two major dimensions it is possible to divide applications into low, medium and high performance.

1.6 Hotter, Faster, Thinner

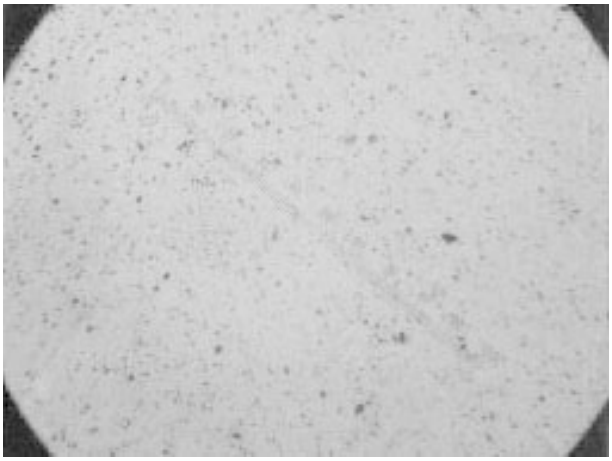
Past developments are one thing, but most of the interest lies with future growth and new opportunities. With the diversity of plastics applications, predicting future developments is fraught with difficulties. It is instructive however, to focus on a few of the current trends and to explore the implicit consequences for colorant choice and development. Hotter, faster, thinner (and more environmentally friendly) fairly summarises today's performance pressures. 'Hotter' and 'faster' often come together as processors increase temperatures to increase flow rates, reduce cycle times and increase outputs. Not only does this directly increase the thermal performance required from the colorants, but higher temperatures, lower viscosities and shorter cycle times also mean lower shear and less mixing which in turn places additional demand on dispersability.

'Thinner' relates to continuing efforts to reduce wall thicknesses in injection moulding and layer thicknesses in co-extrusions and blow moulding. The thinness of the layer and the greater visibility of undesirable pigment agglomerates naturally place increasing demands on the quality of the pigment dispersion (103). However, the situation suffers from the added complication that to get adequate colour depth or opacity in the thinner layer requires a higher pigment loading. In general higher pigment loadings lead to inferior dispersion so the trend toward thinner sections puts considerably increased pressure on the dispersability of the pigment and the quality of the dispersion processes (44, 73, 200).

1.7 Delivery Systems (71, 84)

As virtually all colorants are supplied to the market as powders, the process of incorporation into the plastic mass in a homogeneous, highly dispersed fashion, but at low overall concentration (typically 0.01-1%) clearly offers some challenges (**Figure 1**). This review is primarily about the choices of colorants rather than the delivery processes, however, some understanding of

(a)



(b) ISO rating = 3

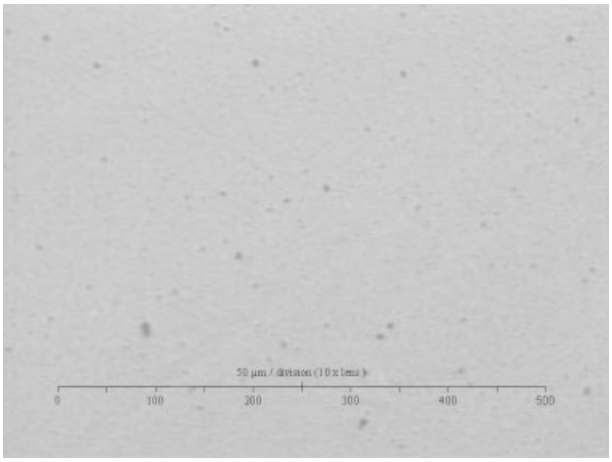


Figure 1

Images of unsatisfactory (a) and satisfactory (b) dispersion of pigments in plastics. Poor dispersion is often characterised by visible pigment agglomerates. *(Images reproduced with permission from Cabot Plastics Hong Kong and Ponga Donga Pty Ltd.)*

commercial dispersion processes is required to appreciate some of the current trends. Colorant dispersion, particularly pigment dispersion, comprises a wetting step in which the 'fluid' (the plasticised polymer) is brought into intimate contact with the total surface of the powder, and a homogenisation process step which disperses the colorant evenly throughout the medium. As the specific surface of the pigment is very high (often 20-30 m^2/g and sometimes much higher) and the final concentration of pigment is very low (usually well under 0.05%) both processes are quite challenging. It is not possible to get a satisfactory result by simply adding polymer and pigment directly to the final processing machine. Some intermediate processing is essential.

Originally, the intermediate activity was undertaken by the plastics processor who combined pigment and polymer together in a dry blend (often in a simple tumble mixer) prior to feeding it to the processing machinery. In the case of flexible PVC, a pigment paste was prepared in the plasticiser (109). However, as the pressures for consistency, homogeneity and efficiency increased, most of this intermediate activity was transferred to specifically designed equipment (123).

The process of pigment wetting and dispersion typically requires the application of high shear. However, to apply an energy intensive and potentially damaging shearing process to the whole polymer volume makes little sense when the pigment being dispersed makes up such a small proportion. Consequently, the industry has more or less concluded that the most economically efficient process is to conduct the high shear dispersion process off line, and to produce highly loaded but fully dispersed concentrates. The concentrates are then diluted in the final plastics processing step.

This led, in turn, to the development of separate operations whose business was the production of concentrates and compounds. Some colours are still supplied as dry powder blends, but by far the majority are produced as masterbatch granules in which the colorant is dispersed in high concentration in a suitable polymer prior to granulation. Compounds are polymers that have been coloured to the 'final colour' and so can be processed directly into final product. Another delivery option is via the use of liquid carriers to form 'liquid colours' or pastes (83).

According to Applied Market Information (59) 27% of plastics are coloured, 23% black, 24% white and 26% uncoloured. Of the coloured plastic, 64% is coloured by masterbatch, 22% by compound, 12% by dry powder and 2% by liquid colour.

1.8 Easy Dispersing Pigments

Although the immediate demands of the plastics industry for consistency and homogeneity can largely be satisfied by current processing techniques, there have been few developments in recent times that address the underlying physical challenges of wetting and dispersion. Consequently this area continues to provide potential opportunities for innovation and cost saving. In many cases it is easier to address this problem 'at the source' while the pigment is still in a slurry form in the manufacturing process. This has lead a number of pigment manufacturers to develop pigment preparations. Examples include: BASF's Eupolen® range, Ciba's Microlen® range and Sun's Sunflush® range.

These products 'solve' the dispersion problem by incorporating pigments in a highly dispersed form in a low molecular weight polymeric carrier. The increasing volumes of these products being sold, and the increasing range of pigments that are available in these forms, attest to their benefits and market acceptance, however, they are not without problems. In general, their melt behaviour and intense colouring power makes them unsuitable for use directly by end processors, and even for masterbatchers, the high levels of carrier polymer present in these preparations limits their application. Consequently, there is ongoing interest in the development of more concentrated forms.

Another route towards 'easy dispersing' pigments is the one followed in recent years by Ciba with the development of new versions of many established products featuring better dispersion behaviour through the 'elimination' of 'over-size' pigment particles.

From the processors' perspective, economic pressures in the colorant supply chain are encouraging masterbatchers to extract the maximum colour value from the pigments they use. Their alternatives are either to 'pay the pigment producers to do the dispersion work' by paying a premium for the preparations described above, or to make their own highly-loaded, 'optimally'-dispersed, single-pigment concentrates of each individual pigment, or to 'forget' about maximizing colour value through optimal dispersion and compensate for the value 'lost' through suboptimal dispersion by maximising processing throughput. All three strategies are actively deployed within the masterbatching industry, but as other processing productivity improvements become more widely implemented, the focus on dispersion control will steadily increase.

The diversity of pigment chemistries, the very high levels of specific surface involved, and the wetting behaviour of the various molten polymers combine to create significant technical difficulties in this area of 'easy-dispersing-pigments'. This area however, is one to keep under review, as it remains one of the few areas in which pigment producers can differentiate themselves, at a time when many of their key products are coming off patent.

1.9 Non-Dusting, Free Flowing

Increasing pressure in North America and Europe for safer, cleaner work places has also led to innovations in product forms. Dusting is a particular problem with organic pigments due to their low bulk density and light fluffy nature. Organic dyes tend to be even worse, not because they are intrinsically more dusting, but, due to their very high colour strength, their dust has a correspondingly high tendency to cause visible contamination. Because of this, the pressure for dust reduction amongst dye users was, and is, very strong.

A second major handling challenge is 'flow-ability'. Whilst not intrinsically connected with dusting, good 'flow-ability' of powdered colorants leads to better feeding control and more consistent production. The solution to both problems lies in getting the dusting, powdered colorants to bind together to form 'flowing, non-dusting' granules. The trick is to get the granule structure to be strong enough to survive transportation and handling, but not so strong that it impedes the dispersion process. The leader in this area has been Bayer, which has developed granular versions of many of its popular dyes and organic pigments. Ciba is also active in this area with several of its dyes and pigments now being offered in granule form.

Clariant tackled this challenge from a different direction and developed a new range of pigment preparations called DrizPearls®. This range features very high pigment concentrations, and results in a relatively small addition of carrier material to the final formulation. The high concentration has been combined with a novel product form to offer substantially increased bulk density, improved flow properties, and therefore improved handling properties. The first products in this range were based on well known pigment chemistries: Pigment Yellow 180, Pigment Yellow 181, Pigment Red 170, Pigment Red 122, Pigment Violet 19 and Pigment Violet 23. Anecdotal feedback suggests that the dispersion properties of this new form mirror those of the underlying pigment.

2 The Colourants

2.1 Yellow Colour

Yellow (240) is currently the biggest battleground in plastics. The falling popularity of heavy metal based pigments has opened a substantial market for alternative chemistries, thus making yellow the most strongly contested area in the whole spectrum of plastic colouration. The demise of the two previously dominant colorants lead and cadmium has created something of a product vacuum that offers the possibility of significant growth for the major pigment companies. If any one producer could capture this market the potential gains could be very large and as there are few other opportunities for growth and differentiation, yellow is where most of the product innovation activities are occurring.

In terms of heat resistance, light fastness and dispersability, lead and cadmium pigments offered a range of yellow shades from greenish through to reddish yellows with good to excellent properties. They were relatively cheap, easy to manufacture and 'easy' to use, which lead to competitive pricing and an attractive value proposition for most applications. However, growing awareness of the health problems associated with excessive absorption of heavy metals, fear of unknown consequences of low dose, long duration environmental exposures, and the increasing trend in many countries towards incineration of waste (during which trace loadings of heavy metal may be discharged to the atmosphere through the flue gases) have lead to wide-spread opposition to their use. The Nordic countries took the strongest action (for example Sweden's Cadmium ordinance), but many other countries and industries (e.g., automotive manufacturers) have also established policies and regulations. The restrictions are by no means uniform around the globe. In Europe and North America the usage of cadmium pigments has been strongly curtailed (150), however in other countries they continue to be used in selected situations. The use of lead pigments has been reduced in Northern Europe, but they still find relatively wide use in Southern Europe, North America and the rest of the world.

A further important factor in the reduction of lead and cadmium usage has been the globalisation of manufacturing and food production, as this has obliged many manufacturers to produce all their output to the standard set by their most demanding market. This has led to wider adoption of tough restrictions against heavy metals than just the country and industry for which they were established. Many manufacturers in other parts of the world have found themselves obliged to comply

with the European and North American limitations. The net consequence has been a stagnation or reduction of total volumes of cadmium and lead pigment usage and substantial growth in heavy metal free alternatives. Thus most producers have seen substantial growth in demand for their yellow organic pigments.

Initially, the most cost-effective organic alternatives were based on diarylide chemistry (Pigment Yellow 13, Pigment Yellow 14 and Pigment Yellow 83 being the ones most widely used in the plastics industry). These pigments displayed high colour strengths (1/3SD < 0.1%) and competitive costs of colouring, though in terms of fastness properties, their performance is low. However, particularly damaging to their extended utilisation was the discovery that carcinogenic by-products could be generated during their decomposition. This posed a potential danger to plastic process workers running hot machines, as well as to the general public through incineration of plastic garbage (234). As a consequence, and except for selected low temperature applications such as coloration of PVC and some polyethylene products, diarylides too, had to be phased out (425).

The simultaneous 'disfavour' of lead, cadmium and diarylide pigments has created substantial demand for organic yellow pigments and this surge in demand has spurred strong interest by the pigment manufacturers in developing new and more competitive offerings.

2.1.1 Low Performance Applications

Low performance applications are defined here as requiring low temperature processing and low to moderate light fastness.

The main yellow pigments used for low performance applications are:

- in greenish yellow shades:
  Pigment Yellow (PY) 61 and 168 (azo salts).

- in mid yellow shades:
  PY34 (lead), 13, 14, 17, 83 (diarylides) and PY62 (azo salt).

- and in the red shade area:
  PY139 (isoindoline) and PY42 (iron oxide).

The main yellow dyes used for low performance applications (typically polystyrene) are:

Solvent Yellow (SY) 14, 33, 114 and 141.

All of these products are made by multiple manufacturers and are produced in large volumes. However, as the required performance profile is low, cost of colouring considerations are typically of major importance and this has led to very keen pricing around the world. Unfortunately this leaves little margin or incentive for product innovation and therefore, even though the volumes in this segment are substantial, there is little likelihood of major new products being introduced. In this area, it is more likely that manufacturers will focus on incremental improvement.

Azo pigments should not be confused with the azo dyes that were the subject of the German azo ban. Although there is an underlying similarity in the chemical reaction (diazotisation) used in their preparation (hence the name) their properties are substantially different.

2.1.2 Medium Performance Applications

Medium performance applications are defined here as requiring medium temperature processing and moderate to good light fastness.

The main yellow pigments used for medium performance applications are:

- in the greenish yellow shades:
  PY138 (quinophthalone), PY155 (disazo) and to a lesser extent PY81 (disazo).

- and in mid yellow shades:
  PY34 (lead, coated), 151 (monoazo), 183, 191, 191.1 (azo salts). Coated versions of the brownish iron oxide PY42 can also be used in this area.

Mid performance dyes include SY93 and 163.

This is a segment with intense development activity. The pressure to maximise plastic processing productivity has, in many situations, driven processing temperatures out of the range of most of the lower performing pigments. As a result there is now substantial demand for pigments with somewhat higher temperature resistance. It is also an area in which, for many years, relatively few new products were introduced so that once the restrictions on heavy metals started to take effect, the market found itself short of competitive alternatives. Thus it is an area of opportunity for the manufacturers and one in which they have been focussing significant developmental effort.

The most dramatic result of that effort has been the prolific developments of Engelhard. In a short space of time they have launched six new azo chemistries: PY205, 206, 209, 209:1, 210 and 212; three new products based on 'older' chemistries (PY 62, 151 and 194) which they claim demonstrate improved performance in selected respects; and in addition, they have introduced 10 new 'combination products' in which typically two colourants have been 'co-processed' (17, 57, 131). These combination products have been designed to satisfy certain subsegments of the market on the 'right fitting' principle discussed earlier. The combination of colourants typically introduces performance compromises, but Engelhard have endeavoured to turn this characteristic to advantage by matching the compromises to the minimum performance specifications of various application niches. By sacrificing selected performance aspects in a calculated manner they claim to yield better economic results.

Other suppliers have typically taken the view that pigment value is maximised by maximising the total product performance capability and thereby maximise the usage options for the customer. This approach generally leads to single products designed to have the widest possible applicability. It will be interesting to see how the competition between these two philosophies evolves.

Engelhard may have been the most prolific but they were certainly not alone. From BASF came PY185 (as a predispersed preparation) and a modified form of PY183 giving a greener hue and increased strength. From Ciba came PY191.1 and subsequently a stronger, free flowing version of the same chemistry. Clariant produced a new disazo pigment (PY214) with a bright green shade, an improved (stronger) version of their PY191 chemistry (168) and a trial pigment PY192 (67).

In spite of all this developmental activity, there is no clear winner as yet. All the major pigment producers aspire to dominate this sector by developing the most cost effective, mid-performance product. Ironically, most of the new products launched into this area in recent times have had similar hues and have used 'similar' azo chemistry. This is presumably because azo chemistry offers many variations and readily generates mid-shade yellows with acceptable performance properties and an attractive ratio between colour strength and cost. But with all players following the same strategy, it seems that we are facing something of a war of attrition between suppliers, which should benefit processors and end users with competitive yellows for some years. In the end, the critical success factor is likely to be the colour strength/cost ratio, with product consistency and production economics playing supporting roles. This is certainly an area to watch for future developments.

2.1.3 High Performance Applications

High performance applications are defined here as requiring high and extreme temperatures and good to excellent light fastness.

The high performance segment is more fragmented than the mid performance one as the range of performance demands is rather wide. For instance, the polymers vary from polyolefins through the 'styrenics' to the 'engineering resins' including polyamide and the fluoropolymers, with processing temperatures ranging from 270 to 350 °C. Light fastness requirements can vary from six months to twenty years outdoor exposure. These wide ranges, which are present in all colour areas, lead to significantly more products than the segment volumes warrant, but the range of demands is too great for any one pigment to be able to satisfy all requirements.

The main yellow pigments used for high performance applications are:

- in the greenish yellow shades:
  PY35 (cadmium), PY93 (disazocondensation), PY161 (mixed metal oxide), PY184 (bismuth vanadate).

- in the mid yellow shades:
  PY53 (nickel titanate), PY34 (lead-coated grades), PY35 (cadmium), PY95 (disazocondensation), PY180 (benzimidazolone), PY150 (nickel azo).

- and in the red shades:
  PY35 (cadmium), PY110 (isoindolinone), PY181 (benzimidazolone).

High performance dyes include: PY147, 163, Disperse Yellow (DY) 201, 241 and SY130.

For top light fastness and heat stability it is hard to exceed the performance of (selected) inorganic pigments (65, 324). These also have high refractive indices which gives them substantially higher opacity or hiding power than the organic pigments. Unfortunately however, most of these inorganics are also characterised by severely weak and dull colouristic properties. Their ability to impart chromatic opacity leads to extensive use, particularly

of PY53, Pigment Brown (PBr) 24 and PY184, in combination with organics across a wide spectrum of applications (325). In this area Bayer claims recently to have developed a yellow iron oxide (PY42) with enhanced heat stability and suitability for a wide range of engineering resins (42).

Notwithstanding the unpopularity of cadmium (PY35) its versatility as a colourant should not go unremarked. Through minor changes in composition it is possible for manufacturers to produce a wide variety shades varying from greenish yellow through orange and red to bluish 'burgundy' shades. Without exception these pigments have outstanding chroma values that are difficult (and sometimes impossible) to replicate using other colourants. In addition they are heat stable, easy to disperse and generally durable. For these reasons the development of alternate formulations has been particularly challenging.

In high performance applications, when brightness, strength and cost effectiveness are the principle requirements (and performance requirements are not extreme), the pigment choice usually reverts to the disazocondensation pigments (PY93, 95). These pigments have been industry workhorses for many years. Interestingly, recent experiments by Clariant to incorporate a hindered amine light stabiliser into the chemical structure of PY95, suggest a possible way to achieve substantial improvements in weathering performance of these well-known pigments (67).

Typically, colorant prices in this segment have been high due to costly manufacturing processes, small product volumes and limited competition within subsegments. However, even in this area, there have been some important developments. In the greenish yellow area, Ciba has recently commenced promoting PY128 (disazocondensation) and Clariant's recently launched disazo-based PY214 may also be suitable. The cost of colouring benefits of these new offerings are likely to push formerly mainstream pigments like PY109 (isoindolinone) and PY134 (bismuth vanadate) to niche application roles.

There have been relatively few new high performance dyes introduced to the market in recent years but that does not mean that nothing is happening 'under the surface'. For instance, Bayer recently introduced a very strong reddish yellow dye based on quinophthalone chemistry (Macrolex Yellow E2R; with no Colour Index number). Clariant is also active. Some time ago they developed PY192 (which behaves as a pigment in polyolefins and PVC, but is soluble in polar polymers and thus behaves as a dye), but they now claim (67) to have developed modified versions of this chemistry that display better heat and light stability, and resistance to chlorine bleach.

With the high levels of attention being paid to food purity and prevention of contamination there is likely to be renewed interest in the use of reactive dyes that can be chemically bound to the polymer substrate and thus provide excellent migration resistance. Eastman's brown reactor-coloured polyester polymer ('Amberguard®') was one such example and the patents EP 1043365 to Hoya Healthcare Corp, and US 5662707, US 5528322 and WO 9511279 to Alcon Laboratories Inc. in the area of ophthalmic plastic lenses (119, 247, 289, 349) shows that others are also active in this area. A third example (though not a yellow one) is the demonstration by Qinghua and co-workers of the melt reactive dying of polyamide fibre with a reactive perylene chemistry (35), see also (88).

2.2 Orange Colour

Unlike the areas of yellow and red, where the number of pigments on offer is very large, the choice of orange colorants is very limited (240). It is also likely that overall market demand for orange coloured products is lower than for yellow and red. A further factor reducing the demand for orange colorants is the simple fact that orange colours can be produced by the addition (in small amounts) of a red pigment to a (majority of) yellow. Oranges produced by this means generally have a duller or 'dirtier' appearance than those produced directly with an orange pigment, but for less critical applications this is often good enough.

2.2.1 Low Performance Applications

The main orange pigments used for low performance applications are: Pigment Red (PR) 104 (lead molybdate) and Pigment Orange (PO) 34 (diarylide).

2.2.2 Medium Performance Applications

Mid performance applications can often be satisfied by PR104 (lead molybdate), but the fact that it is based on lead chemistry now precludes its use in many situations. Of course, higher performing pigments such as PO20 (cadmium) and PO64 and 72 (benzimidazolones) can also be used but these bear an economic penalty.

Given this situation it is surprising that the development of mid performance organic pigments has taken so long. However, alternatives are now entering the market. Engelhard came first with its novel orange azo PO79 (azo), which seems already to have been well accepted, followed by three multi-component 'co-processed' products. More recently, a new candidate for this application area (PO80) has been developed by Clariant based on their thiazine chemistry (67).

2.2.3 High Performance Applications

The main orange pigments used for high performance applications are:

- Pigment Orange (PO) 20 (cadmium), and
- Pigment Orange 64 and 72 (benzimidazolone).

There are a number of other high performance orange pigments but these are typically applicable to niche applications and, as such, are used in small volumes and frequently at high prices. Clariant's new thiazine orange may also be suitable for some high performance applications.

The main orange dyes are Solvent Orange 14 and 105 for low and mid performance applications, Solvent Orange 60 for mid and high performance and Disperse Orange 47 for high performance in the reddish shades.

Two inorganic orange pigments, PO75 and 78, based on cerium chemistry have also been launched (64, 301, 363). These pigments demonstrated solid thermal resistance and compatibility with most engineering resins, so it was hoped that they might serve as replacements for cadmium. In some respects they do indeed demonstrate comparable performance, however, like most inorganics (but unlike cadmium) they were relatively weak and seem not to have enjoyed wide adoption.

Amongst the dyes, the major new orange dye to be launched in recent years was Solvent Orange 114 based on a new dye chemistry isoxindigo from Ciba (117).

2.3 Brown Colour

Brown coloration does not sit on the chromatic colour circle as colouristically it is an orange reduced with black. However, commercially it is a relevant colour and there are a small number of important pigments to be acknowledged. Brown can be achieved by many mixtures of colours (red with black, orange with black, orange with blue, red with green, etc.), but there are still occasions when simplicity, cost or other technical considerations call for the use of a brown pigment.

The main brown pigments used are:

- Pigment Brown (PBr) 6 and Pigment Red 101 (iron oxide),
- PBr29, 33, 35 (iron/chrome complexes),
- PBr24 (chrome titanate),
- PBr31 and Pigment Yellow 119 (zinc ferrite),
- Pigment Yellow 162, 163 (mixed metal oxides),
- PBr23 (disazocondensation), 25 (monoazo).

Most brown pigments are based on inorganic chemistry. Iron oxide is the most widely used brown colorant in plastic as it is relatively cheap and widely applicable. The buff coloured chrome titanate is also widely used, partly for its own colour in outdoor applications (especially PVC) and also as a coloured opacifying agent in combination with more chromatic organic pigments. One of the important niche applications for brown pigments is colouration of rigid PVC profiles used in external construction applications such as window profiles. Many of these trim colours are dark shades and these can cause problems due to their tendency to absorb solar radiation and consequently to heat up. This increases building temperatures and in the worst cases causes parts to expand and then deform through buckling or warping. Thus the key pigment attribute for these applications is low absorption of infrared radiation and hence a low tendency to cause heat build-up (65, 352). PBr23, 25, 29, 35 and a new pigment from Ferro, V-780 (with no Colour Index number), are all claimed to demonstrate this low absorption behaviour.

Not only is Pigment Red 101 widely used in plastics, but it is also available in a small particle form that generates a transparent brown. This version finds wide use in the mass colouration of synthetic fibres.

There are only a few brown dyes on the market (for example Solvent Brown 53 and Pigment Orange 70) because it is relatively easy to create a transparent brown from the various yellows, oranges, reds, greens and blues already available. Such combinations could

become increasingly important for the protection of flavour and nutrients in foods and drinks from light degradation (382), and as the usage of PET in packaging applications increases.

PET bottles are a major application for dyes in plastics, particularly for the green lemonade bottles and (some) blue mineral water bottles. PET usage, and especially PET usage in bottles is one of the fastest growing applications in the whole of the plastics industry (10-15% pa around the world), which already makes for an interesting scenario, but it could become even bigger. At the moment there is relatively little beer, milk or fruit juice distributed in PET bottles. There are a number of problems to be overcome and then the extent of PET usage could increase dramatically.

One of the problems that has to be resolved is the protection of bottle contents from degradation due to UV and visible blue light to provide adequate shelf life. Glass provides a little protection, green glass a little more and brown glass is very good. But glass is heavy and the fuel costs for its transport are almost double that of PET, so the aim is to protect the contents of PET bottles by colouring the PET with dyes that will block and absorb the damaging radiation. The resulting colour will most likely be green, brown or yellow (though it will be a result of deliberate and specific wavelength manipulation rather than matching to a predetermined colour). However, there is still work to be done on bottle barrier properties as well.

2.4 Red Colour (30, 66, 108, 240)

Being primary colours, red, yellow and blue are the most important pigment colours for colouring plastic. After yellow, red has been the next most active area for pigment development. However, the overall situation in red is somewhat different. There are considerably more types of red pigments than yellow. The majority of the red chemistries are over twenty years old now and so are well known and are available from multiple sources in the market. Secondly, heavy metals and diarylides, even at their peak, played a smaller role in the red area, so their recent fall from grace has had less impact on the market. The red market is therefore more mature and has shown progressive consolidation over recent years as customers have tried to rationalise their usage to fewer pigment types. This has caused the pigment manufacturers to focus on maximising the versatility of the pigments in their ranges to give the widest application profile at a price that will be acceptable to the majority of customers (22).

2.4.1 Low Performance Applications

The main red pigments used for low performance applications are:

- Pigment Red (PR) 48:x (the 2B toners, azo salts), PR57:1 (4B toner, azo salt),
- PR53:1 (barium lake),
- PR38 (pyrazalone/diarylide).

Another widely used alternative has been the combination of PO34 (lead) with a bluish red or maroon colour such as PR57:1.

2.4.2 Medium Performance Applications

The mid performance red market is one of the most competitive parts of the plastics colour market. It used to be dominated by naphthol based pigments (PR170, 187) and to a lesser extent the niche diketopyrrolopyrrole (DPP) pigment, PR272.

In one of the more dramatic moves of recent years, Ciba chose to reposition its high performance PR254 chemistry into this segment by introducing a new pigment with the same Colour Index but substantially lower price (137). Furthermore, it followed this with a second version designed to overcome one of the few limitations of the DPP chemistry, namely its tendency to cause shrinkage and warping of HDPE parts. This occurs because the pigment surface triggers rapid nucleation during the freezing of crystalline polyolefins, but in the new, non-warping version, the pigment surface has been modified to prevent this. The availability of such high performance products at mid performance prices has been a lucky bonus for the plastics industry, not just because it lowers the cost of red coloration but it also allows processors to rationalise and reduce their range of red pigments (30). Such largesse, however, probably had more to do with the commercial opportunity associated with domination of the red area, and perhaps also with the imminent expiry of the early DPP patents, than with corporate generosity.

There have been relatively few totally new pigments developed in the mid performance red area. Interestingly, most of the innovation has been at the yellowish end of the red spectrum. Of note in this scarlet colour area is a new azo red from Engelhard, PR276, which has good heat stability but only modest light fastness (240). Engelhard have also developed a new

bluer shade monoazo red (PR277) and have two further monoazo reds (PR280 and 281) under development. The other new product in this colour space is the bright, yellowish red PR279 based on the new thiazine chemistry from Clariant.

2.4.3 High Performance Applications

The main red pigments used for high performance applications are:

- PR108 (cadmium),
- PR144, 214, 242 (disazocondensation),
- PR149, 178 (perylene),
- PR177 (anthraquinone),
- PR254 (diketopyrrolopyrrole) and
- Pigment Violet 19 (gamma quinacridone).

These days the performance of anthraquinone has largely been eclipsed by the disazocondensations, perylenes and DPPs. Furthermore, the repositioning (reduction in price) of selected DPP products has pushed the other chemistries into niche roles in this high performance segment. On the other hand the DPP and thiazine chemistries also have a fundamental limitation in the high performance segment in that they tend to dissolve in the more polar polymers. This dissolution behaviour causes them to lose their bright red shade and revert to yellow coloured dyes (67).

Although they were once widely used in injection moulding, the main applications these days of the disazocondensation pigments and the PR149 perylene are in fibre (especially polypropylene fibre) where their transparency is prized. PR108, PR178 and PR254 are relatively opaque and this is preferred for many injection moulded parts.

At the opposite extreme PR187 (naphthol) is a highly transparent bluish red that is widely used in mass coloured fibre applications.

The main red dye used in plastics applications and possibly the largest single plastics dye product is the medium performance Solvent Red (SR) 135. Solvent Red 111 is also widely used. Other smaller volume red dyes include SR24, 179, 207 and 227.

Of note in the high performance red area are the two pigments PR265 and 275 based on cerium chemistry that were introduced by Rhodia (64, 301, 363). With bright, opaque colouristic properties, these were anticipated to displace some cadmium usage, but their weak colour strength has limited their popularity. Clariant's new thiazine, PR279, should also satisfy some high performance applications (67).

2.5 Maroon and Violet Colour (106, 132)

The division of red pigments between 'mid to bluish red' and 'maroon to violet' is inevitably somewhat arbitrary. There are a considerable number of red pigments in use in the plastics industry and they do not fall nicely into discrete bluish and maroon groups. This situation is further complicated by the widespread tendency for pigment hues to move bluer in the presence of an opacifying agent like titanium dioxide. For some pigments this shift is quite large (approximately 30 degrees) whereas for other pigments it is only 5 to 15 degrees. For convenience in this analysis the notional boundary line was drawn at a hue angle of 0 (or 360) degrees. There are some pigments whose hue angles in full shade and white reduction span this divide, such as Pigment Red 57:1 (4B toner) and Ciba's mixed crystal quinacridone, Cinquasia Red B RT-195-D (which has no CI number). These were dealt with arbitrarily in this study by assigning the 4B toner to the reds (along with other similar toner chemistries) and the quinacridone to the maroons like most other quinacridones.

Maroon and violet colouration is one of the smaller areas of the spectrum in terms of colorant volumes.

2.5.1 Low Performance Applications

Typical of the low performance applications in this colour area are pastel pink and purple colours for packaging and toys. Interestingly, there are no low performance colourants in this part of colour space and consequently all low performance applications have to be coloured with either medium or high performance products. Not surprisingly, therefore colourant selection here is typically driven by cost and shade considerations.

The relatively small volumes demanded by this sector create little pressure for additional products, although brighter or stronger versions of the existing ones would always be welcomed.

2.5.2 Medium Performance Applications

The main maroon/violet pigments used for mid and low performance applications are:

- Pigment Red 122 (quinacridone),
- Pigment Violet (PV) 15 (ultramarine),
- PV16 (manganese),
- PV19 (beta quinacridone) and
- PV23 (dioxazine).

Quinacridone chemistry forms the mainstay of maroon and pink colours in plastics and has been in continuous production since 1958. Interestingly, most of the world's production capacity for quinacridone pigments has been installed in the USA, which has led to some distortion of global usage patterns (i.e., substantially higher usage in North America than in Europe). The manganese violet is not very widely used as there are concerns about the potential for damaging interactions between the manganese and the polymers.

The new products in this colour area are a pink and a violet (PV51 and 52) from Engelhard. The chemistry has not been revealed, but the performance characteristics look to be complementary to the quinacridones in that they are claimed to have good heat stability and good (low) cost of colouring at the expense of light fastness.

2.5.3 High Performance Applications

The main maroon/violet pigments used for high performance applications are:

- PR122, 202 (quinacridones),
- PV14, 48 (cobalt),
- PV19 (beta quinacridone),
- PV29 (perylene),
- PV37 (dioxazine).

The pigment options for high performance applications bear a close resemblance to the mid performance set, with the notable addition of PR202 which has outstanding thermal resistance and light fastness. This pigment is one of the few pigments to be fully suitable for colouring polyamide. The maroon coloured perylene (PV29) is rather dull for most injection moulding applications but its high transparency suits it to the production of rich 'burgundy' colours in fibre applications. At high temperatures and low concentrations PV23 is somewhat vulnerable, so in extreme conditions it is safer to use its sister dioxazine pigment, PV37.

Whilst the technical performances of quinacridones are good, they are not particularly strong (colouristically) and in many cases are difficult to disperse. Product developments in this area have been focussed on making the pigments easier to disperse, rather than on new chemistries. Bayer, Ciba and Clariant have all been active: Bayer with its easy handling, easier dispersing granules (107); Ciba with its easier dispersing, disagglomerated pigment forms; and Clariant with an easier dispersing version of its PV19 beta violet (168). Bayer is in the process of selling its North American quinacridone production and product lines to Sun which itself has substantial quinacridone capacity.

The main maroon and violet dyes are Solvent Red 52, Disperse Violet 26, Solvent Violet 13, 36 and 37.

2.6 Blue Colour (43, 63)

Blue is the third of the primary colours and although it is colouristically important, there are relatively few pigments. Blue coloration is dominated by phthalocyanine chemistry. One of life's ironies is that whilst phthalocyanine is one of the strongest, most heat stable, light fast, weather fast pigments, it is also one of the oldest (first commercial production in 1935) and cheapest, and at 80,000 tonnes per year (not all for plastic applications!) one of the biggest volume pigments in the industry.

Phthalocyanine blue comes in several forms, of which three are relevant for plastics applications. The phthalocyanine molecules can follow two alternative stacking arrangements in the formation of pigment crystals, defined as alpha and beta. The alpha form is available in both stabilised and unstabilised configurations. The alpha form is roughly 10 degrees redder in hue than the beta form, though the addition (during pigment manufacture) of stabilisation pushes the product somewhat greener. The unstabilised alpha form is therefore the reddest and strongest of the three forms but is only stable to 220 °C and consequently is limited in its applications. By contrast stabilised alpha and beta forms are stable to 300 °C or more.

The combination of spectacular performance and very low prices for phthalocyanine changes the discussion of pigment selection from the normal question of

finding a pigment whose performance can satisfy the demands of the application, to one of determining whether there is any reason not to use phthalocyanine. There are a few situations when it might be better not to use phthalocyanine and one of them can be the shade of blue that is required.

Generally redder shades of blue are more popular in plastics coloration than greener shades. This leads to a preference for the alpha form of phthalocyanine or even redder blues like ultramarine (Pigment Blue (PB) 29) or indanthrone (PB60). However, all of these are more expensive (in some cases considerably more) than beta phthalocyanine. The alternative way to produce reddish blues is to 'shift' the shade of the beta phthalocyanine with the addition of a small amount of a violet or maroon pigment such as PV23 or PR122. This approach can be applied so long as the inevitable loss of brightness or chroma is acceptable.

One problem associated with the phthalocyanine pigments is their effect on polymer nucleation rates during cooling. Both alpha and beta forms of phthalocyanine blue trigger rapid nucleation of HDPE and PP (81). In the case of polypropylene (PP), whose natural crystallisation rate is already high, the main effect of phthalocyanine blue (and green) pigments is to increase tensile modulus and strength and to reduce impact strength (14, 86, 89, 100). The physical dimensions of the part are not strongly affected. However, in the case of HDPE the higher rate and extent of crystallisation caused by the presence of the pigment leads to marked shrinkage, principally in the direction of polymer flow. This leads in turn to dimensional instability, and, in moulded parts, distortion and warping. The precise mechanism by which this nucleation occurs is not known but it clearly arises from interactions between the crystalline surface of the pigment and the surrounding polymer chains.

There are at least four modified phthalocyanine pigments on the market and in each case the pigment manufacturer has attempted to modulate the pigment-polymer interaction by applying a coating to the pigment surface. Unfortunately, in every case this has a negative effect on colour strength and/or brightness and/or heat stability and none of the products currently available could be regarded as fully satisfactory. It is certainly an area that invites further innovation.

In blue, the dominance of phthalocyanine is such that we can conclude that alpha and beta phthalocyanine will be the pigments of choice for all blue applications except the following:

- for very reddish shades, PB29 (ultramarine) or PB60 (indanthrone)
- for very high temperatures or in chemically aggressive applications, PB28, 36, 74 (cobalt aluminates)
- for reddish coloured non-warping applications PB29 (ultramarine) or PB28, 36, 74 (cobalt aluminates)

With the dominance of phthalocyanine chemistry, through high performance and low prices, there is little incentive to develop new chemistries. However there has been some progress with Clariant foreshadowing the development of a benzimidazolone-modified dioxazine pigment that will be 'much redder' than PB60 (67). Other manufacturers have continued to refine their products and some examples include:

- Holliday with several new grades of ultramarine pigments that are claimed to exhibit reduced variability in colour and volatile content, and widens the range of hues available (51).
- BASF with a version of alpha phthalocyanine blue (PB15:1) that is claimed to be non-warping.
- BASF with a new form of cobalt blue (PB28) claimed to be cleaner and redder than previous offers (113).

The main blue dyes are Solvent Blue 35, 36, 59, 67, 97, 104 and 122, and Macrolex Blue 3R from Bayer (which does not have a Colour Index number).

2.7 Green Colour

The situation in green is even narrower than in blue, with just one pigment dominating the sector. Phthalocyanine green, Pigment Green (PG) 7, like its blue counterparts, is strong, heat stable, light and weather fast. However, unlike blue phthalocyanine, the green has only one crystal form.

The volumes of green pigment used are lower than the volumes of blue despite their comparable strength and performance. This is partly because many commercial green colours are relatively dark and so can be made easily from blue and yellow. The other factor is that the shade of the phthalocyanine green is somewhat bluish, certainly too blue for a lot of yellowish green colours that are variously described as 'grass green' or

'lime green'. From a pigmentation viewpoint, these bright green colours contain mostly yellow with only a small percentage of either phthalocyanine green or phthalocyanine blue.

Although they are undeniably good pigments, the phthalocyanines (blue and green) are not without their challenges. As discussed above they tend to cause shrinkage and warping in crystalline polyolefins (such as HDPE and polypropylene), though the green generally has less impact than the blues. But a second challenge with phthalocyanines is their dispersion in polymers (18). They are typically difficult to disperse and require the application of substantial shear. Because of this, and despite the fact that phthalocyanine blue and green are relatively cheap, the use by the masterbatch industry of predispersed preparations of these two pigments is high and growing strongly.

As with blue, the question of using alternative green pigments turns on whether there is some reason that phthalocyanine green (or blue) cannot be used. For instance, in large HDPE mouldings (such as the wheeled garbage bins used in many countries) the shrinkage behaviour is critical and the pigment of choice is often the olive coloured chrome oxide (PG17). For certain pastel shades, or for opacity, or to satisfy exceptional thermal or weathering demands, the two mixed metal oxides PG26 and PG50 are occasionally used. PG36, the yellowish brominated form of PG7 (PG7 is a chlorinated form of PB15) is also available but it is typically difficult to disperse and is seldom used.

For dyes, the situation is similar, with only two green dyes finding significant application in plastics: the rather bluish Solvent Green 3 and the mid shade Solvent Green 28. In part this is because producing transparent green colourations (such as can be seen in many green coloured soft drink bottles) through the use of combinations of yellow dyes and a small amount of phthalocyanine blue is often cheaper than using the green dye on its own. Yellow dyes SY93 and PY147 are frequent candidates for this application.

3 Special Effects

'Special effects' covers a vast collection of colouring materials which fall outside the ranges of conventional pigments and dyes, but which none the less make an important contribution to plastic colouration. They include metallic, pearlescent, iridescent, 'holographic', fluorescent, edge-glow, phosphorescent, thermochromic and photochromic varieties (60, 265). Usage of these colorants adds an additional dimension to styling possibilities and has experienced growing popularity, especially for consumer goods packaging requiring high visual impact. The trends for 'multi-dimensional colour' are forecast to continue so we should expect to be challenged by more iridescent, ethereal, layered and metallic effects for almost all applications (53).

3.1 Metallic

The first special effect pigments were powdered metals. The most commonly used metallic pigments today are aluminium pigments but copper, bronze, nickel, gold, silver, iron and graphite powders are also available. Aluminium powders in particular are available in a wide range of particle sizes, which enables effects from a fine metallic sheen to large bright sparkles (62, 85, 185, 198, 205, 259, 291, 338). Metal pigments can be used on their own or in combinations with transparent colorants. (Use of opaque colorants substantially hides and diminishes the lustrous or sparkle appearance of the metallic pigment.)

Typically, metallic pigments are produced as thin platelets (**Figure 2**). Their large aspect ratio (relatively long and wide but very thin) causes them to align very strongly with the direction of flow of the polymer matrix

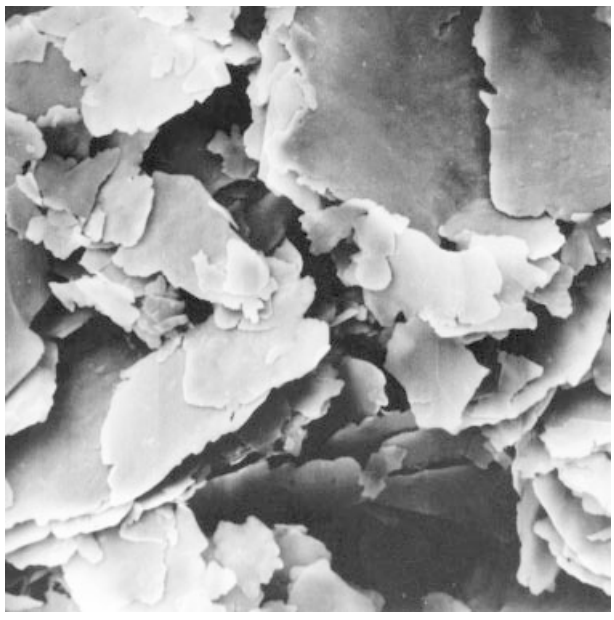


Figure 2

A typical aluminium flake pigment
(Reproduced from I. Wheeler, Metallic Pigments in Polymers, Rapra Technology Ltd., Shawbury, UK, 1999)

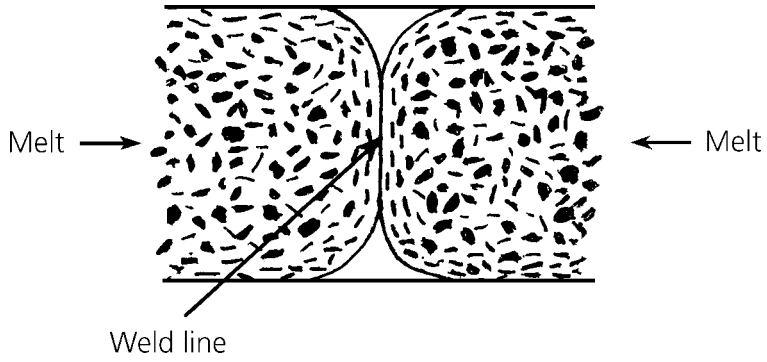


Figure 3

Schematic diagram of metallic flake orientation at the melt front
(Reproduced from I. Wheeler, Metallic Pigments in Polymers, Rapra Technology Ltd., Shawbury, UK, 1999)

in which they are dispersed. This has the beneficial effect in most applications of ensuring that the pigment plates are parallel to the surface of the plastic part and thereby maximising the specular (mirror-like) reflection. One of the unfortunate side effects is that where two flows meet in a mould or a film die, the merged stream does not undergo enough sheer to give a homogeneous alignment of the pigment particles and an unsightly boundary line is created (**Figure 3**). Considerable effort has been made in recent years to modify the aspect ratios of the particles in order to eliminate or diminish this flow line problem (115, 235).

A further variation on the metallic pigment theme is aluminium pigments in which a colorant has been deposited on the surface of the aluminium thus creating coloured metallic effects independently of the use of secondary coloration of the plastic (235, 260, 284). Further variations include coating the metal with a thin layer of silica to create an interference pigment similar to the mica-based products described below (250). Metal pigments can also serve functional as well as decorative purposes as they can provide: reflection of electromagnetic radiation, a barrier to diffusion, heat conductivity, electrical conductivity and microwave absorption (291).

3.2 Pearlescent

Possibly the biggest segment of special effects pigments are the interference pigments comprising the pearlescent, iridescent and colour change types (27, 39, 41, 45, 53, 104, 128, 136, 139, 151, 155, 171, 173, 183, 192, 199, 207, 209, 211, 213, 253, 282, 290, 377). These pigments provide the additional aspect of lustre to coloured plastics. Pearlescent pigments are also platelet type materials, like the metallic pigments discussed above, and the size of the platelet determines the 'texture' of the resulting lustre (343). The strong angular dependence of the intensity of reflectance from these pigments gives them a brilliant flash at particular viewing angles and this can be harnessed to create a variety of visual effects. Very small platelets give fine-grained satin finishes reminiscent of natural pearl, whereas large individually visible particles give sparkling and granite-like effects. This broad range is used to give depth and non-plastic appearances to many plastic products. It can also be used to produce strongly metallic appearances, including under-the-bonnet automotive parts moulded in polyamide (283).

The special nature of this family of pigments comes from their layered platelet structure. The layers are specially constructed so that incident light is partially transmitted and partially reflected between successive layers. Differences in refractive index between the layers, combined with multiple transmission and reflection pathways, leads to a pearlescent appearance that varies with the angle of view. Even amongst the simpler constructions, a wide variety of material combinations are used. Typically, the substrate layer for these products is a thin (500 nm) sheet of a material with a low refractive index such as mica, silica, alumina or glass. On to this is coated a highly refractive metal oxide such as TiO_2 or Fe_2O_3. For products based on natural mica, in which the thickness of the substrate material varies, the resulting colour depends roughly on the thickness of the coating. The thinnest coatings yield a silvery 'fish scale' appearance and thicker coatings giving successively yellow, red, blue and green effects. If, instead of mica, a synthetic base material is used (such as glass or silica) in which tight control is exercised over the thickness, the apparent colour will vary with the viewing angle giving rise to the now well-known

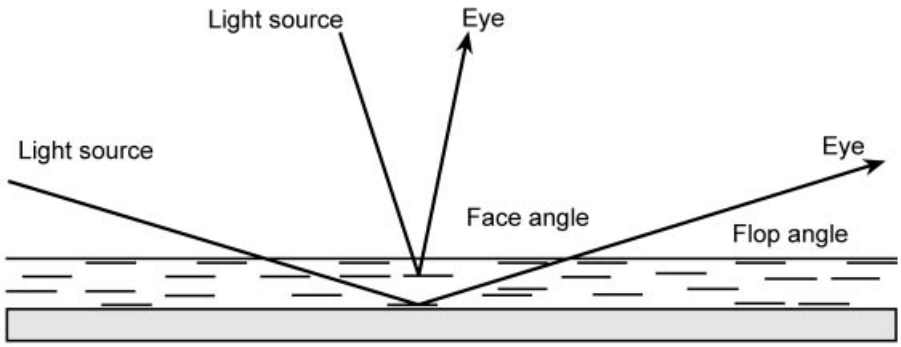


Figure 4

The principle of flop
(Reproduced from I. Wheeler, Metallic Pigments in Polymers, Rapra Technology Ltd., Shawbury, UK, 1999)

'flop' effects (the appearance 'flops' between one colour and another as the part is turned) (**Figure 4**). Further effect modifications can be achieved if multiple layers are coated on to the substrate. Recent developments have focussed on maximising brilliance and the 'distance' the colour travels with change of viewing angle. The intensity of the 'flop' can sometimes be enhanced by judicious choice of an additional transparent tint, which can reinforce or extend the apparent colour shift. There are now many varieties of iridescent pigments on the market whose colour travels vary from a few degrees to half way around the colour circle (green to red, green to violet, maroon to orange, etc.).

However, for all the brilliance of the high colour travel pigments, by far the biggest usage volume in the plastics industry goes to the plain 'silver' pearlescent. This versatile material comes in a wide range of particle sizes which generate corresponding variations in the smoothness or graininess of the resulting lustre and can be combined with a vast array of transparent pigments to yield satin appearance finishes in every conceivable colour.

Interestingly, these pearlescent pigments have found application in other areas than purely decorative. The recent literature includes, laser-marking, special agricultural mulch films and spectrally selective glazing films (40, 221, 231, 299, 328, 336).

Other variations on the theme include silica coatings on aluminium and bronze pigments (250) and colorants deposited directly on a titanium dioxide-coated mica interference pigment (333).

The platelet shape of the pearlescent pigments gives rise to the same processing challenges as for metallic pigments. The formation and location of flow lines caused by particle alignment with polymer flows needs to be managed carefully. Most platelet pigments (metallic and interference) are also sensitive to the high shear rates that are present in most pigment dispersing equipment such as twin-screw extruders and can be degraded by harsh treatment.

3.3 Holographic

Related in effect, but different in structure from the interference pigments are the holographic pigments. These pigments are made by grinding up holographic films. However, as the films are themselves polymeric, it has proven difficult to find a suitable set of processing conditions that are hot enough to plasticise the host polymer but not so high as to soften the film polymer (61, 127).

3.4 Fluorescent

Fluorescent colours are well known for their glowing colours and dramatic visual impact (146, 206, 345). These bright results occur because the colorant (usually a dye) absorbs light from one part of the spectrum and, after some internal transformations, emits it at another (lower energy) part of the spectrum. It is this additional emission that is responsible for the 'unnaturally bright' colours that we associate with fluorescence.

As well as contributing brilliance to colours, the ability of fluorescent dyes to 'harness' additional wavelengths can be deployed in light collection. With appropriate control over the refractive index, a transparent plastic sheet coloured with a fluorescent

dye will experience substantial internal reflection of the fluorescent radiation. As the light can only escape at the sheet edges, this gives rise to a significant concentration or 'focussing' effect otherwise known as 'edge glow'.

Fluorescent colours have been available for a number of years now and the range of colours available is relatively static. The active component of most fluorescent colorants is a dye, but dyes cannot be used directly in the colouration of olefinic polymers due to the high mobility of the dye molecules and their tendency to migrate to the polymer surface. To apply fluorescent colour to olefinic polymers without excessive problems of dye migration, fluorescent dyes have been chemically bound to inert, mineral carriers to create a colorant that behaves like a pigment.

Once the range of common fluorescent colours became established, most development attention was turned to two of the common weaknesses of fluorescents; namely; poor light fastness and a tendency to deposit on the inside surfaces of plastics processing equipment, which leads to contamination and cleaning challenges (105, 339).

This plate out problem has now been significantly diminished by a number of suppliers through better attachment of the dye to the carrier. The problem of light fastness is more fundamental. For most (but not all) fluorescent dyes the act of fluorescing slowly destroys the active ingredient and so the fluorescent effect fades away over time. Among the more widely used fluorescents are: Solvent Yellow 98, Solvent Yellow 135, Solvent Yellow 145, Solvent Yellow 160:1, Solvent Orange 63, Vat Red 41, Solvent Red 195 and Macrolex Red G (which does not have a Colour Index number). There is also the Lumogen F range from BASF (which do not have Colour Index numbers) but these products tend to be used in relatively small volumes. Finding a better trade off between performance and cost will require the development of new fluorescent chemistries.

3.5 Phosphorescent (12, 31, 38, 82, 148)

In the past, the main phosphorescent pigments were based on zinc sulfide. This displayed relatively poor durability and the glow process was exhausted after two to three hours in the dark. In the early 1990s, however, the situation changed considerably with the introduction of a new class of phosphorescent pigment based on an alkaline earth (typically strontium) oxide aluminate. This produces a much brighter glow that lasts substantially longer (up to ten or twelve hours is claimed). Its improved visual performance combined with good chemical resistance (except perhaps against water) has given a new lease of life to glow-in-the-dark applications. However, incorporating the pigment into a plastic matrix must be done with care as it can be damaged by high shear and it tends to be abrasive.

3.6 Thermochromic and Photochromic

Thermochromic and photochromic colorants are highly novel in that their colour can be made to change, and can subsequently be changed back, i.e., the colour change is reversible. Thermochromic colorants respond with this change between two coloured states (one of which can be colourless) at a well defined transition temperature. In some systems it is possible to tailor the temperature of the transition as well as the specific colours displayed in the warmer and cooler states. The response is rapid and usually only limited by the thermal conductivity of the polymer.

Photochromic colourants mainly change between colourless and coloured forms in response to UV light. The response is slightly slower than thermochromics but still occurs in minutes.

Thermochromic (114, 134, 238, 316) and photochromic (208, 340, 218) colorants are highly specialised with few suppliers in each category. Despite the dramatic effects that are able to be achieved these colorants are generally expensive and are only used in niche applications.

4 Summary and Conclusions

Any summary of a field as broad as the coloration of plastics is bound to be relatively cursory. This paper, based in part on references in the Rapra Polymer Library, has concentrated on the main colorants (pigments and dyes) being used in today's global plastics industry, recent and foreshadowed colorant developments and a description of the trends and influences that are having the strongest effects on colorant choice and colorant development.

The plastics industry is not short of colorants and finding a recipe to achieve a desired colour has been possible for most colours in most polymers for some

time. However, in recent times new factors have emerged, such as restrictions on the use of heavy metals and some organics, more demanding plastics processing conditions, tighter specification on final visual quality and ever tougher economic conditions, which have created new opportunities.

In most parts of the colour spectrum, the choice of preferred colorants has been generally established, and most of the recent product development is for processing improvement, and slight product performance improvements. However, in the yellow colour area the palette is far from resolved. There are already a very large number of yellow pigments suitable for plastics usage and yet in recent times at least ten additional products have been launched. Supremacy in the yellow area is the last major unresolved competition in the plastics industry and until it is, we can expect serious endeavours from all the main players.

The other main trend to note is the tendency of the colorant dispersion and 'colour service' aspects of the industry to become more specialised and more independent. For many years producers of colour concentrates performed colourmatches and dispersed powdered pigments in plastic in integrated production facilities and this is still widely practiced today. However, the pressures for better dispersion, better extraction of the full colour value of the pigments and shorter service times are highlighting the inherent compromises present in the 'all in one' approach. Increased usage of predispersed pigments, and ongoing efforts by the pigment producers to improve the handling and dispersion performances of their products are two of the recent responses to this pressure and no doubt the next few years will see further developments in this area.

The increasing use of plastic, and the increasing use of colour will ensure that the future for plastics colouration is a bright one.

Acknowledgments

This paper was facilitated by the assistance and contribution of many people. My thanks go to: Peter Roberts, Mark Diveney, Willi Gunterman, Rodney Gaunt, Don Langdon, David Lunt, Harry Sarvis, Gunter Steinbrecher, Roland Valin and Ian Wheeler for their support, and to my long suffering family for their forbearance.

Additional References

a.1 H.M. Smith (Ed.), *High Performance Pigments*, Wiley-VCH, Germany, 2002.

a.2 R. Scherrer and R. Sykes in *Plastics Additives Handbook*, 5th Edition, Eds., H. Zweifel, Hanser, Munich, 2001.

a.3 W. Herbst and K. Hunger, *Industrial Organic Pigments*, Wiley, 1997.

a.4 DIN 53235, Testing of pigments. Part 1 Standard depth of shade. Depth of shade standards. Part 2 Tests on specimens having standard depth of shade, adjustment of specimens to standard depth of shade, 1977 and 1974.

Abbreviations and Acronyms

CI	colour index
DPP	diketopyrrolopyrrole
DY	Disperse Yellow
FDA	US Food and Drug Administration
HDPE	high density polyethylene
OHS	occupational health and safety
PB	Pigment Blue
PBr	Pigment Brown
PET	polyethylene terephthalate
PG	Pigment Green
PO	Pigment Orange
PP	polypropylene
PR	Pigment Red
PV	Pigment Violet
PVC	polyvinyl chloride
PY	Pigment Yellow
SD	standard depth
SR	Solvent Red
SY	Solvent Yellow

Abstracts from the Polymer Library Database

Item 1
Plastics Technology
48, No.9, Sept.2002, p.35
NEW ORANGE PIGMENTS SHRUG OFF THE WEATHER

Two new orange pigments from Engelhard Corp. of the USA are the subject of this concise article. The new pigments, "Synergy Orange 6114" and "Synergy Orange 6115", are suited to high-weathering applications, such as outdoor rubbish containers and recycling bins.

ENGELHARD CORP.
USA

Accession no.869529

Item 2
Plastics Technology
48, No.9, Sept.2002, p.33
NEW VIOLET COLORS ARE CUSTOMIZED FOR COST-PERFORMANCE

Two new "Engeltone" violet pigments (Violet 1118 and Violet 1120) from Engelhard Corp. of the USA are drawn to our attention in this concise article. They are said to be cost-effective alternatives to high-performance organic types.

ENGELHARD CORP.
USA

Accession no.869528

Item 3
Shawbury, Rapra Technology Ltd., 2002, 21 papers, pp.174, 30cm, 012
SPECIAL EFFECTS IN PLASTICS. PROCEEDINGS OF A CONFERENCE HELD BERLIN, 6TH-7TH NOV.2002
(Rapra Technology Ltd.)

Twenty-one papers are presented at this two conference focusing on the latest developments in surface finish techniques and special effects in plastics. Papers are divided into four sessions: Session One - Adding value with special effects; Session Two - Special pigments and colourants; Session Three - Materials that make the difference; Session Four - Adding special films and protective layers.

EU; EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE; WESTERN EUROPE-GENERAL; WORLD

Accession no.869424

Item 4
Modern Plastics International
32, No.11, Nov.2002, p.67
FLUORESCENT COLORS OFFER MORE THAN MEETS THE EYE
Toensmeier P A

Through his company, Depro Design & Production, Rolf Bender has been applying his knowledge of fluorescence to products ranging from novelties and signage to packaging, security and safety. Bender not only designs products, but formulates his own fluorescent materials, which he develops from a number of sources. Depro offers a line of colours called Plastilight, which can be supplied as pellets or as rods, tubing, shapes or "strings". Fourteen colours are standard and custom colours are an option.

DEPRO DESIGN & PRODUCTION GMBH
EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.869381

Item 5
Machine Design
74, No.16, 22nd Aug.2002, p.84
SOAP BUBBLES, BEETLES INSPIRE NEW IRIDESCENT PIGMENT

New colourant technology developed by BASF adds a shimmering, kaleidoscopic play of bright colours on plastic parts, it is briefly reported. The new Variocrom colour-variable pigments give more intense colours and complex shifting hues than conventional angle-dependent or "flip-flop" effects, the company claims. Teknor Color developed concentrates that maximise the special effects at minimal loadings and brought them to the attention of hair dryer maker Conair.

BASF CORP.
USA

Accession no.868114

Item 6
Macromolecular Symposia
No.187, 2002, p.789-99
LEAD REPLACEMENT IN THE MOLYBDATE ORANGE COLOUR SPACE
Gee P; Meier M A
Ciba Specialty Chemicals Inc.

Due to toxicological concerns over lead and its compounds, there has been an increasing trend to replace these materials in paint systems. Change has been driven primarily by legislation and regulations; however in many cases global companies have taken both a positive environmental marketing approach over their competitors with lead free paints and a positive move on labour relations. Pigment manufacturers have had the challenge to meet these requirements either from existing product ranges or to develop new pigments that are both commercially and technically viable. Due to the diverse application, systems and cost structures within general industrial paints, no single product exists offering a

universal solution. The higher performing pigments generally meet the higher specifications technically but because of their chemical complexity in processing and structure fail to achieve the lower comparable costs against Molybdate Oranges. With less complex pigment structures, limitations are identified within the technical area. Additionally, within the range of Molybdate Oranges, differing grades are available treated to enhance temperature stability and chemical resistance or untreated to attain lower costs and increased saturation. For this reason paint producers have the choice of a single product within the mid performance area that acts as a compromise or alternatively can select three products to fulfil all requirements with the associated logistic problems on supply, stock inventory and quality testing. Pigment Orange 81 potentially offers the most flexible solution in order to meet the volume market for mid performance offering opacity, gloss, rheology, bleed resistance, good temperature stability and, importantly, the ability to match the colour space occupied by Molybdate Orange.

SWITZERLAND; WESTERN EUROPE

Accession no.867974

Item 7
Macromolecular Symposia
No.187, 2002, p.631-40
PIGMENTS WITH IMPROVED PROPERTIES - MICROREACTION TECHNOLOGY AS A NEW APPROACH FOR SYNTHESIS OF PIGMENTS
Kim H; Saitmacher K; Unverdorben L; Wille C
Clariant GmbH

Clariant, as an important pigment producer, instigates the investigation of new pigments with improved qualities and properties to fulfil the future demands of customers. For these reasons, new production methods such as microreaction technology are included. Emphasis is placed on results obtained in manufacturing pigments in a laboratory-scale microreactor as well as in a microreactor pilot plant. Investigations of the diazotation, azo-coupling and laking steps of pigments have shown not only the principle feasibility of these reactions in laboratory microreactors but also significant improvement of colouristic properties. The microreactor pilot plant, realised by the concept of numbering-up instead of conventional scaling-up process, allows more detailed investigations of the complete azo-pigments synthesis under production conditions. 7 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.867962

Item 8
Chemical Marketing Reporter
262, No.7, 2nd Sept.2002, p.6
BAYER PLASTICS TO LAUNCH A NEW COLOURING PROGRAM FOR ENGINEERING RESINS
Hoffman J

Bayer Plastics is to unveil its new Fantasia programme for engineering resins on September 4. The company says the programme, which features five separate technologies and an array of colour and special effects options, will be the industry's most complete single-stop solution for colour and special effects. Fantasia's range of colour and special effects are designed to give products a unique look and feel, based on their composition and how light reflects off their shape. To illustrate, Bayer has designed a marketing tool that includes a range of three-dimensional spoons to showcase many of the see-and-feel effects and capabilities of each of the five technologies. Brief details are noted.

BAYER CORP.
USA

Accession no.867433

Item 9
Macromolecular Symposia
No.187, 2002, p.109-20
CORROSION INHIBITED METAL PIGMENTS
Kiehl A; Brendel H
Eckart-Werke

Flake-shaped particles of aluminium are well known in the coatings and printing ink industry as 'silver bronze pigments'. For their use in waterborne coatings or outdoor applications, effective corrosion protection of the highly reactive aluminium surfaces is required. The traditional stabilisation techniques for aluminium pigments are based on the addition of corrosion inhibitors or on chromate passivation. New developments in the encapsulation of metallic pigments based on modern sol-gel techniques are presented. All products are heavy metal-free and provide excellent applicational properties. 10 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.867372

Item 10
Pitture e Vernici
78, No.14, 1st-15th Sept.2002, p.27-32
English; Italian
NEW METALLIC PIGMENTS FOR POWDER COATINGS
Wheeler I R
Silberline Ltd.

Powder coating applications present special challenges for metallic pigments. It is a technology well placed to respond to ever-tightening environmental protection legislation. Two new pigment options for this rapidly growing market are presented. With these and other recent contributions, many of the market-limiting challenges of the past can be overcome. Recent advances, especially in colouristic quality, handling, durability, safety and cost reduction, are described. 13 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.866706

Item 11

ANTEC 2002. Proceedings of the 60th SPE Annual Technical Conference held San Francisco, Ca., 5th-9th May 2002.
Brookfield, Ct., SPE, 2002, Paper 97, Session M24-Color and Appearance, pp.6, CD-ROM, 012

ORGANIC COLORS AND THE FOOD & DRUG ADMINISTRATION .... WHAT IS ACCEPTABLE IN TODAY'S MARKETPLACE

Lewis P A
Sun Chemical Corp.
(SPE)

US Federal Regulations relating to organic food colouring additives are discussed, including colourants for plastics in packaging applications which are in direct or indirect contact with foods. The use of approved fatty food simulants to measure migration from plastic to food is explained. Also covered by federal regulations are colourants for plastic products used for food storage and processing in the home. Approved red, violet, orange, yellow, blue, and green pigments, including conditions of use, are tabulated.

USA

Accession no.866283

Item 12

Plastics Technology
48, No.6, June 2002, p.29

BLUE PIGMENTS GLOW IN THE DARK FOR HOURS

It is announced in this little article that Honeywell Specialty Chemicals of the USA has added new blue shades to its line of luminescent pigments: "Lumilux Effect Blue SN" and "Lumilux Effect Blue SN-F". Brief details are given of the new shades.

HONEYWELL SPECIALTY CHEMICALS
USA

Accession no.864720

Item 13

ANTEC 2002. Proceedings of the 60th SPE Annual Technical Conference held San Francisco, Ca., 5th-9th May 2002.
Brookfield, Ct., SPE, 2002, Paper 22, Session M5-Injection Moulding General Session 1, pp.9, CD-ROM, 012

EFFECT OF PROCESSING CONDITIONS ON THE APPEARANCE OF FLOW LINES IN INJECTION MOLDED ARTICLES INCORPORATING PEARLESCENT PIGMENTS

Prasannakumar J; Ghogomu P; Nunn R E; Schott N R; Fiddy M; Dyer K; Dugan M; Jones S
Massachusetts,University; Engelhard Corp.
(SPE)

The influences of processing parameters on the appearance of weld and flow lines in injection moulded polypropylene components containing 0.5-2.0 wt% pearlescent pigments was studied by passing a parallel beam of light through moulded samples and recording the resulting intensity distribution of the light using a CCD camera. The most significant parameters were melt temperature and injection speed. Mould temperature was less significant, and holding pressure had no significant effect on flow line appearance. 10 refs.

USA

Accession no.863871

Item 14

ANTEC 2002. Proceedings of the 60th SPE Annual Technical Conference held San Francisco, Ca., 5th-9th May 2002.
Brookfield, Ct., SPE, 2002, Paper 18, Session M4-Injection Moulding Materials, pp.5, CD-ROM, 012

EFFECT OF PIGMENT TYPE AND CONCENTRATION ON THE MECHANICAL AND THERMAL PROPERTIES OF INJECTION MOULDED POLYPROPYLENE

Hanna P R; McNally G M; Major I; Kearns M P
Belfast,Queen's University
(SPE)

The influences of phthalocyanine blue and green, and titanium dioxide white pigments on the mechanical and thermal properties of injection moulded isotactic polypropylene were investigated. Samples containing 0.1-2% pigment were injection moulded using mould cooling temperatures of 40 C, 60 C and 80 C, and stored at room temperature and -40 C prior to tensile, falling dart impact testing, and crystallinity studies by differential scanning calorimetry. The blue and green pigment additions increased the tensile modulus and strength, particularly at higher mould temperatures. The impact strength decreased with increasing mould temperature and increasing pigment concentration. The crystallinity increased with increasing mould temperature. It was concluded that the pigments had a nucleating effect, particularly the phthalocyanines. 5 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.863867

Item 15

Plastics Additives & Compounding
4, No.7-8, July-Aug.2002, p.16-9

CREATING SPECIAL EFFECT MASTERBATCHES: CLOSING THE GAP BETWEEN EFFECT PIGMENT MANUFACTURERS, PLASTIC CONVERTERS AND OEMS

Suschnig J
Gabriel-Chemie GmbH

Innovative special effects for plastics are playing an increasingly important role in the design process. Creating special effects in plastics can mean metallics, flitter, speckles, marble, pearl lustre, interference, high clarity transparent colours, fluorescents and pigments that change their colour depending on the light and angle viewed. Ways to avoid flow lines in injection moulded products when producing metallic colours are discussed. Special effect masterbatches are an important tool that allows converters and OEMs to differentiate their products and packaging from the competition. To get the best possible results, special effects should be created in close cooperation with the pigment suppliers, as well as the product development departments of OEMs, designers and converters.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.862695

Item 16
Additives for Polymers
June 2002, p.4/5
HONEYWELL ADDS TWO NEW LUMINESCENT BLUE PIGMENTS

Two new luminescent blue pigments from Honeywell Chemical Specialities in Germany are the focus of this short article. The new pigments ("Luminex Effect Blue SN" and "Luminex Effect Blue SN-F"), which are excited by visible and UV light, replace "Luminex Effect Blue N". Brief details are given.

HONEYWELL CHEMICAL SPECIALTIES
EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.859068

Item 17
Plastics Technology
48, No.5, May 2002, p.27
HIGH-VALUE YELLOW PIGMENTS FOR PLASTICS

A new line of yellow pigments has been designed by Engelhard Corp. of the USA, to reduce costs for formulators of plastic colour concentrates. Brief details are given of the properties of the new pigments: "Synergy Yellow 6226", "Yellow 6209", and "Yellow 6211".

ENGELHARD CORP.; US,FOOD & DRUG ADMINISTRATION
USA

Accession no.858981

Item 18
Polymer Testing
21, No.6, 2002, p.675-89
OPTICAL ANALYSES OF PIGMENT PARTICLES IN COLOUR CONCENTRATES AND POLYPROPYLENE YARNS
Van De Velde K; Wassenhove V; Kickens P
Ghent,University

Royal blue and grey bulked continuous filament (BCF) PP yarns and colour concentrates (monobatches and masterbatches) are analysed for pigment aggregates and agglomerates by optical microscopy. Comparing the aggregates results on slices and films, the shapes of the particle size distribution curves are analogous based on the analyses of monobatches, masterbatches and yarns, the following conclusions can be made. The dispersion quality of the blue pigment is insufficient. The phthalocyanine (beta)-Cu complex (PB 15:3) is better dispersed than the alpha-form (PB 15:1). The pigment red PR 57:1 and PR 214 tend to form fewer particles but their average equivalent diameter is high. Titanium dioxide is well dispersed in one analysed monobatch (WI601PCO) but the other contains an amount of small aggregates not to be ignored. Carbon black is generally well dispersed. 6 refs.

BELGIUM; EUROPEAN COMMUNITY; EUROPEAN UNION; WESTERN EUROPE

Accession no.858806

Item 19
Shawbury, Rapra Technology Ltd., 2002, pp.122, 30 cm, 1/6/02. Rapra Review Report 146, Vol. 13, No.2, 2002. NALOAN
IN-MOULD DECORATION OF PLASTICS
Love J C; Goodship V
Warwick,University
Edited by: Humphreys S
(Rapra Technology Ltd.)
Rapra Review Report No. 146

Variations of in-mould decorating are reviewed, for the production of fully or partially decorated components straight from a variety of moulding processes. Such techniques can produce primers, labelling, graphics, natural patterns and automotive-style paint finishes, and are widely used in many packaging and automotive applications. Chosen techniques can involve the use of a film, powder, granules or liquid paint, and the lack of reliance of traditional paint shops is claimed to provide a selection of cost, space, processing time and environmental benefits. In-mould film technologies, injection in-mould paint, on-mould painting, and in-mould primer technologies are reviewed. 480 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.858076

Item 20
Shawbury, Rapra Technology Ltd., 2002, pp.116, 30 cm, 1/6/02. Rapra Review Report 145, Vol. 13, No.1, 2002. NALOAN

MULTI-MATERIAL INJECTION MOULDING
Goodship V; Love J C
Warwick,University
Edited by: Humphreys S
(Rapra Technology Ltd.)
Rapra Review Report No. 145

A review is presented of multi-material injection moulding processes. Coinjection, bi-injection, and interval injection moulding techniques are discussed, followed by sections on multi-shot moulding(B1) and overmoulding. The selection of materials is discussed, with reference to material bonding properties and general material properties. 387 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.858075

Item 21
British Plastics and Rubber
May 2002, p.5
PIGMENT CHOICE IS IMPORTANT FOR A LONG CABLE LIFE

Polyone and Borealis are reported to have joined forces to study the interaction between unimodal and bimodal PE and coloured pigments in wire and cable jacketing applications. The formulation of a coloured polymer material calls for the right combination of polymer, stabilisers, inorganic or organic pigments, processing aids, and sometimes mineral or other fillers. Lead-based inorganic pigments are well known to have outstanding performance in terms of light fastness, but today their use is limited. As the industry moves away from the use of heavy metals, inorganic pigments are being replaced by organic alternatives. Therefore, the selection of the pigment becomes more complex, especially for critical colours used in cable jacketing like red and orange. This combination of materials in the cable jacket formulation can give unexpected results under the influence of outdoor weathering and so requires a good understanding of the ageing process to provide the necessary properties and performance for each formulation. It was shown that there is no significant difference in colour measurements as well as mechanical evaluations between unimodal and bimodal PE polymer. The greater influence on the results was due to the choice of pigment. Orange lead-containing pigments used in cables showed the best mechanical performance. The lead and halogen free red pigments showed excellent colour performance, and gave acceptable mechanical properties in the cables. Brief details are given.

POLYONE; BOREALIS AG
USA

Accession no.857550

Item 22
British Plastics and Rubber
May 2002, p.4
COULD THIS BE THE END OF STOCK COLOURS
Gaukroger T
ColourTone Masterbatch

Pressure to reduce stock holding of materials, the advent of just-in-time production and demands to get products into the retail chain as fast as possible are forcing processors to seek greater levels of service. Fortunately the latest polymers, additives, equipment and processing technology have provided the tools to meet these needs by enabling the formulation and manufacture of bespoke masterbatches that can be introduced to an increasing range of base polymers at dosages unheard of 20 years ago. Custom masterbatch formulations produced and delivered in less time than it takes to source a standard off-the-shelf product could signal the end of stock colours and the compounding of certain polymers.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.857549

Item 23
Additives for Polymers
April 2002, p.2
ENGELHARD LAUNCHES NEW YELLOW AND VIOLET PIGMENTS FOR PLASTICS AND COATINGS

Engelhard Corp. of the USA is reported in this concise article to have introduced a new line of high-value yellow-coloured pigments for plastics and industrial coatings, called the "Synergy" pigment range. The company has also launched two new violet pigments in its "Engeltone" line. Brief details are given.

ENGELHARD CORP.; US,FOOD & DRUG ADMINISTRATION
USA

Accession no.855879

Item 24
Plastics Additives & Compounding
4, No.4, April 2002, p.14
PRE-COLOURED COMPOUNDS CATCH THE EYE

Pre-coloured compounds from RTP have been used by US electronics company Cybiko in an eye-catching wireless Personal Digital Assistant for maximum impact. Cybiko uses an RTP 300 Series polycarbonate, pre-coloured in metallic and chroma-shift colours for the moulded enclosures of the Xtreme. The chroma-shift parts change colour because of a precise combination of pigments and dyes that display a geometric metamerism usually known as colour travel or chameleon effect. The company says that the material has good heat, light and stability, as well as a notched impact strength of 801 J/m at 3.18 mm, which were considered ideal for this application. The hand held Cybiko Xtreme features a wide range of features especially designed for students, including e-mail, games, scientific calculator, address

book, clock and MP3 player. The idea behind the Xtreme is that a trendily-styled electronic gadget will make learning a more enjoyable experience. This abstract includes all the information contained in the original article.

RTP CO.
USA

Accession no.855870

Item 25
Pigment & Resin Technology
31, No.1, 2002, p.46
GOLDEN YELLOW REACTIVE DYE

Ciba Specialty Chemicals has recently launched two products. Cibacron Yellow C-RG is described as a bireactive golden yellow dye available in powder and liquid form, combining high cost effectiveness with outstanding properties: among numerous benefits claimed are exceptionally high light and wet fastness, high fixation, and excellent build up and washing-off behaviour. It is said to be designed for dyeing cellulose fibres by all continuous dyeing processes and for dyeing polyester/cellulose blends by pad-thermosol-pad-steam and pad-thermosol-pad-batch methods. It is recommended for standard shades in combination with Cibacron Red C-2G, Blue C-R and/or Navy C-B and as a trichromatic component in combination with CIBACRON Red C2BL and Blue C-R-for pale shades requiring high light fastness. CIBACRON Yellow C-RG can be used for dyeing emerised fabrics. Reported to be distinguished by exceptionally high hot light fastness, Ciba Teratop Orange HL is believed to be ideal for automotive applications. This non-dusting, free-flowing dye, which fulfils KO-TEX standard requirements, is produced to the highest quality standards, ensuring excellent shade reproducibility. The dye is said to be suitable for exhaust and continuous application on polyester fibres. Brief details are noted.

CIBA SPECIALTY CHEMICALS
SWITZERLAND; WESTERN EUROPE

Accession no.852883

Item 26
European Coatings Conference: Adhesion and Performance Enhancement. Proceedings of a conference held Zurich, Switzerland, 3rd-4th Sept.2001.
Hanover, Vincentz Verlag, 2001, Session 3, p.129-48, 31cm, 012
BETTER PREDICTION OF COLOUR DURABILITY IN AUTOMOTIVE OEM TOPCOATS
Czornij P
BASF Coatings AG
(Vincentz Verlag)

Colouring objects serves a number of purposes, ranging from the purely decorative and aesthetic to more functional uses. In automotive coatings, colour and function derived from pigments are key elements to customer satisfaction. The marriage of colour and car body design has a profound influence on the marketability of cars. This combination is continually retooled and refined so as to bring the highest level of innovation and sophistication/flash to car bodies. Colour design features in influences from around the world in non-automotive sectors, such as the areas of textiles (women's fashion), environment, and historical colour associations. Mass acceptances of these colour preferences are difficult to predict, especially since these are dynamic and because psychological associations with certain colour areas are usually either strongly negative or positive. The durability of automotive OEM coatings is of high importance, as prolonging overall service life of cars is a major factor in customer satisfaction. As pigment manufacturers develop new colourants, effective screening tests are required to ascertain whether these products can rapidly be brought to the market and present low risk for durability problems. Accelerated weathering techniques often lead to controversial results, as test speed and accuracy tend to lead in opposite directions. New procedures are being investigated to generate better correlation to long-term durability. However, no single test scheme has been developed to simulate all the weathering variables found throughout the world. New colourants added to the market make use of UV-stable and UV-absorbing components to increase their durability, reducing their risk of field failure, regardless of exposure condition. 17 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.851879

Item 27
Plastiques & Elastomeres Magazine
53, No.8, Nov.2001, p.24-5
French
WHAT ARE MULTI-INTERFERENCE PIGMENTS?
Gouin F

An examination is made of the composition of multi-interference pigments, the special effects which can be achieved by their use in plastics, and types of plastics products in which they can be used. Developments in such pigments by BASF, Flex Products, Merck and Wacker Silicones are reviewed.

BASF AG; FLEX PRODUCTS INC.; CHIMIRAY; MERCK; WACKER SILICONES
EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; GERMANY; USA; WESTERN EUROPE

Accession no.851807

Item 28
Plastiques & Elastomeres Magazine
53, No.8, Nov.2001, p.20/3
French

PRODUCTS AND SERVICES FOR BETTER COLOURING
Gouin F

A survey is made of developments by a number of companies in pigments, colourants and additives for the colouring of plastics and in colour matching techniques and plastics colouring services.

BASF COATINGS; BASF AG; MERCK; CLARIANT; ELIAN; DATACOLOR INTERNATIONAL; MINOLTA; CPS COLOR; DOW PLASTICS
EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; GERMANY; NETHERLANDS; SWITZERLAND; USA; WESTERN EUROPE

Accession no.851806

Item 29
Plastiques & Elastomeres Magazine
53, No.8, Nov.2001, p.16-8
French
MASTERBATCHES FOR SPECIAL EFFECTS
Eznack R
PolyOne Color & Additives Europe

The use of masterbatches or colour concentrates in colouring plastics materials is discussed, and special optical effects which can be achieved using different pigments and colourants are examined.

WESTERN EUROPE-GENERAL

Accession no.851805

Item 30
Plastics Additives & Compounding
4, No.3, March 2002, p.14-7
PIGMENT TECHNOLOGY: SEARCHING FOR A UNIVERSAL RED FOR PLASTICS
Christensen I
Ciba Specialty Chemicals

Pigments are the building blocks of colour in the plastics world, and it is through their many combinations that the final shades apparent are achieved. Of those building blocks, red ones are of particular importance. The requirements for a universal red pigment for plastics that demonstrates all-round performance and suitability for a wide range of applications are described. Following the recent development of a non-warping version, it is proposed that Ciba Specialty Chemicals' Pigment Red 254 is closest to being such a 'universal red pigment'. Pigment Red 254 was introduced to the market in the late 1980s and was the first pigment from the new class of diketo-pyrrolo-pyrrole (DPP) pigments. Product and process development has now resulted in the introduction of new variations of this pigment. For example, Ciba Chromophtal Red 2030 offers good colouring performance and application versatility, particularly in polyolefins, PVC and PS, while Ciba Chromophtal DPP Red BOC demonstrates good weather resistance, making it suitable for demanding outdoor applications. Ciba Irgazin DPP Red BTR exhibits good strength and transparency making it ideal, not only for transparent applications, but also for use in combination with effect pigments such as metallics and pearlescents. Emphasis is placed on the use of such pigments in HDPE, avoiding shrinkage and warpage.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.850114

Item 31
Plastics Additives & Compounding
4, No.3, March 2002, p.6
HONEYWELL INTRODUCES NEW BLUE LUMINESCENT EFFECT PIGMENTS

Honeywell Specialty Chemicals has introduced a new generation of blue luminescent effect pigments. The company says that Lumilux Effect Blue SN and Effect Blue SN-F are suitable for a variety of applications, including plastics. The two pigments are replacing Lumilux Effect Blue N. The new yellowish powder products are excited either by daylight or UV light. The company says that in contrast to Blue N they do not release any hydrogen sulphide on exposure to moisture. The pigments are stable in water, alkaline media and organic solvents, and are only degraded by strong acids. The materials remain unaffected even after exposure to a temperature of 800 deg.C for one hour. Both products fully comply with the requirements of the EN 71/3 standard for toys and neither are skin or eye irritants. Honeywell Specialty Chemicals adds that the luminous intensity of the new pigments is ten times higher than the previous product Blue N. The brightest product is Lumilux Effect Blue SN, which has an average particle size of 50 mm. The pigment is said to remain luminous even when kept in complete darkness for 2200 minutes (more than 36 hours). The fluorescent effect is reversible, which means that it can be re-illuminated as often as required. The more finely grained product Lumilux Effect Blue SN-F has an average particle size of 11 mm and can remain visible for more than 800 minutes after excitation. This abstract includes all the information contained in the original article.

HONEYWELL SPECIALTY CHEMICALS
EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.850104

Item 32
Plast' 21
No.105, Oct.2001, p.146-8
Spanish
MASTERBATCHES A LA CARTE
Sidebottom C; Lunt D
Cabot Plastics

An examination is made of factors influencing the quality of plastics masterbatches and products in which they are used, including the dispersion of pigments and other

additives in the polymer matrix, the dilution of masterbatches in polymers, and the melt flow index of masterbatches. 2 refs.

AUSTRALIA; EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.849033

Item 33
Canadian Plastics
60, No.2, Feb.2002, p.20/3
COLOR IS GOOD
LeGault M

We are told that colourant suppliers and resin OEMs are taking a pro-active approach to colourant development, as they hope to anticipate and eliminate the headaches of colour implementation for processors by offering full-service as well as new, easier-to-use product lines. This article holds full details.

PANTONE INC.; DOW ENGINEERING PLASTICS; PLASTICOLORS INC.; TEKNOR COLOR CO.; ENGLEHARD CORP.; HOLLAND COLOURS CANADA INC.; MILLIKEN CHEMICAL; POLYONE PACKAGING; US,FOOD & DRUG ADMINISTRATION; ELEMENTIS; CLARIANT MASTERBATCHES; PENRO MOLD
CANADA

Accession no.848874

Item 34
Polymer Degradation and Stability
75, No.3, 2002, p.423-30
PHOTOSTABILIZATION OF NYLON 66 IN PRESENCE OF ACID BLUE DYES
Thanki P N; Singh R P
India,National Chemical Laboratory

The effect of two different classes of photostabilisers, UV absorber and hindered amine light stabiliser(HALS), on nylon-66 was investigated for the prevention of the photooxidation of the polymer matrix and colour fading of the dye. Acid blue dyes, UV absorber and HALS were shown to impart photostability to nylon 66. UV absorber and HALS showed photostability directly proportional to their relative concentration in the polymer whereas, in the case of dye, 0.2% w/w concentration was observed as the optimum concentration. Loss of UV absorber with photoirradiation time was found to be inversely proportional to the UV absorber concentration in the polymer, whereas the fading of the dye was directly proportional to its concentration in the polymer. UV absorber imparted higher lightfastness to the dye as compared with HALS. No influence of the substitution on pendant phenyl ring of anthraquinone acid blue dyes was observed for their photostabilising efficiency. 64 refs.

INDIA

Accession no.848526

Item 35
Journal of Applied Polymer Science
83, No.10, 7th March 2002, p.2164-7
MELTING-REACTIVE DYES FOR MASS COLORATION OF NYLON BASED ON BLEND COMPATIBILIZATION: PERYLENE-3,4,9,10-TETRACARBOXYLIC ACID DIANHYDRIDE
Qinghua Meng; Deyin Huang; Lin Chen; Shaohua Wei
Shanghai,Jiao Tong University

Perylene-3,4,9,10-tetracarboxylic acid dianhydride (PTAD) is a melting-reactive dye and it's use for the mass colouration of nylon-1010 is described. During the blending of PTAD and nylon in the melt phase chain-extending reactions took place, resulting in an increase in the intrinsic viscosity of the nylon. The reactive die showed high thermal stability. The method was environmentally friendly. DSC showed blend compatibilisation and low crystallinity. The light fastness of the resultant coloured fibre was 4. 10 refs.

CHINA

Accession no.848101

Item 36
Revue Generale des Caoutchoucs et Plastiques
78, No.797, Sept.2001, p.65-70
French
STUDY OF THE AGEING OF COLOURED PP
Boudry P
Clariant

The composition and compounding of pigment masterbatches for EPM modified PP for use in external automotive components are discussed. Results are presented of natural and artificial ageing studies undertaken to assess the influence of the formulation of such masterbatches on the photodegradation resistance of PP/EPM specimens containing hindered amine light stabilisers. 13 refs.

SWITZERLAND; WESTERN EUROPE

Accession no.846244

Item 37
Revue Generale des Caoutchoucs et Plastiques
78, No.797, Sept.2001, p.60-4
French
COLOURANTS AND PIGMENTS: PLASTICS THAT SHINE
Maugard E

Consideration is given to types of pigments and colourants used in plastics, and reference is made to developments by a number of companies involved in the production of these additives.

CIBA SPECIALTY CHEMICALS; HOLLIDAY DISPERSIONS; WILSON COLOR; CLARIANT; MERCK; BASF AG; ENGELHARD CORP.; HONEYWELL SPECIALITY CHEMICALS GMBH; ALLIEDSIGNAL; SNCI; DAVIS LIQUID CRYSTALS

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; SWITZERLAND; UK; USA; WESTERN EUROPE

Accession no.846243

Item 38
British Plastics and Rubber
Jan.2002, p.32
NIGHT AND DAY, DUALGLO IS THE ONE

In an emergency or a power cut, there is a need to find key equipment like locks, door handles, switches and flashlights. Phosphorescent pigments can provide the answer by creating plastics articles that emit a greenish fluorescence. However, such mouldings do not look attractive in daylight. Jameson Technologies' new DualGlo pigment range combines intensely luminescent day-glow colours with a new generation of phosphorescent pigments. This provides crisp attractive colours in daylight together with a phosphorescent performance more than seven times greater than the DIN standard for safety markings, it is briefly reported.

JAMESON TECHNOLOGIES
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.845349

Item 39
Retec 2001. Hot Colors, Cool Plastics. Conference proceedings.
Marco Island, Fla., 23rd-25th Sept.2001, p.173-8
COLOUR SELLS - COLOUR SHIFT PIGMENT FORMULATION 101
Parker B
Flex Products Inc.
(SPE,Color & Appearance Div.)

Colour shift pigments have been qualified as colour additives for plastic applications by many of the major colour concentrate suppliers and resin manufacturers. A few of the numerous styling options for use with high performance light interference pigments to create an endless palette of new and exciting colour options are described. Colour shift pigments are defined, together with their method of operation, formulation options, polymer systems, applications effects, pigment loading and blending, lightness adjustments, hue and chroma adjustments and special appearance effects.

USA

Accession no.845061

Item 40
Retec 2001. Hot Colors, Cool Plastics. Conference proceedings.
Marco Island, Fla., 23rd-25th Sept.2001, p.162-72
SHADING WITHOUT SHADE: NEW INTERFERENCE PIGMENTS ALLOW A WAVELENGTH SELECTIVE REFLECTION AND TRANSMISSION
Rosenberger S; Aumann S
Merck KgaA; EM Industries Inc.
(SPE,Color & Appearance Div.)

Shading of transparent surfaces is becoming more and more important due to increasing energy costs for air conditioning and lighting. In speciality glazing there is now spectral-selective material available which can help to both reduce these costs and conserve energy. It is also often desirable to prevent solar heat from transmitting, while admitting as much daylight as possible. These are often contradictory requests. In plastics, additives - pigments, dyestuffs and metals - are currently used for shading purposes. These shading additives are compared for their effectiveness. A wavelength selective system for plastic is required, which allows most of the visible light to get through, while most of the IR portion of the sunlight is reflected. Recent developments in new multi-layer pigments allow a spectrally selective translucent glazing for plastic applications. These additives/pigments can be used inexpensively and conveniently. An overview of these new developments is presented.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; USA; WESTERN EUROPE

Accession no.845060

Item 41
Retec 2001. Hot Colors, Cool Plastics. Conference proceedings.
Marco Island, Fla., 23rd-25th Sept.2001, p.144-50
NEXT GENERATION EFFECT PIGMENTS
Becker D
Engelhard Corp.
(SPE,Color & Appearance Div.)

A new generation of effect pigments has been created by the development of proprietary technologies. Metal oxides on mica and borosilicate substrates create dazzling effects in a variety of resins. These innovations exhibit a star-like brilliance, increased chroma and rainbow effects that may be formulated in a variety of eye-catching styles in a wide range of applications, such as mobile phones, computers, toys, packaging applications, countertops, laminates and many other products. The technology behind these new pigments and their use in plastics is described.

USA

Accession no.845058

Item 42
Retec 2001. Hot Colors, Cool Plastics. Conference proceedings.
Marco Island, Fla., 23rd-25th Sept.2001, p.95-109
COST EFFECTIVE, HEAT STABLE, INORGANIC YELLOW PIGMENTS
Rediske J; Potter T; Hennen C
Bayer Corp.; Bayer AG
(SPE,Color & Appearance Div.)

The proliferation of applications for thermoplastic engineering resins requiring higher temperature processing, such as ABS, PS, etc., has given rise to the increased need for good temperature stability in colourants. To achieve this requires the use of pigments whose chemistry is not only stable to external weathering exposure, but also to elevated temperatures in processing. Some new inorganic products are introduced, and some existing materials are reviewed, that exhibit excellent stability to temperature and do so in a cost-efficient manner. A new yellow oxide provides reasonable temperature stability with economic benefit compared to Laux process yellow oxides. This product is being successfully marketed in the thermoplastics industry as a masterbatch and a blending/shading material. A zinc ferrite material with improved temperature stability is also examined. The opportunity to use this product in selected food-contact applications is already available.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; USA; WESTERN EUROPE

Accession no.845052

Item 43

Retec 2001. Hot Colors, Cool Plastics. Conference proceedings.
Marco Island, Fla., 23rd-25th Sept.2001, p.88-94

ULTRAMARINE BLUE, A MODERN PIGMENT

Duhayon C
Holliday Pigments
(SPE,Color & Appearance Div.)

Ultramarine blue is found as a natural colour, called lapis lazuli. This semi-precious gem is still extracted in Afghanistan and in Chile in order to produce popular jewels. It is also the raw material for the brilliant ultramarine blue used in printings and illuminations in old books. Ultramarine blue is a sodium alumino-silicate of sodalite structure containing sulphur. This structure is developed and explained together with chromophore characterisation. Since their introduction they have been subject to a considerable number of developments which have been driven by the requirements of the plastics coloration. Various aspects of the performance of the pigments are examined, with particular emphasis on the environmental aspects of its manufacture and usage. A very accurate and specific method of characterisation in plastic is also presented.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.845051

Item 44

Retec 2001. Hot Colors, Cool Plastics. Conference proceedings.
Marco Island, Fla., 23rd-25th Sept.2001, p.70-82

MEASUREMENT OF DISPERSION QUALITY IN THERMOPLASTICS

Niedenzu P; Holtzen D
Du Pont de Nemours E.I.,& Co.Inc.
(SPE,Color & Appearance Div.)

Measurement of dispersion quality is critical to the successful manufacture and use of pigments and fillers in the plastics industry. There are few, if any, industry standard dispersion tests that relate to release of finished product(s) for use in thermoplastics. Release of products is usually an agreed upon method and quantity of 'imperfections' between a supplier and customer. Four of the most common methods used to rate dispersion quality are reviewed - visual examination, microscopic methods, pressure rise and screen pack retention. Ease of use, cost and relevance to dispersion quality are examined. 1 ref.

USA

Accession no.845049

Item 45

Popular Plastics and Packaging
47, No.2, Feb.2002, p.57-64

IRIDESCENT PIGMENTS FOR PLASTIC APPLICATION

Rane R H; Nere C K; Jagtap R N
Mumbai,University

Iridescent pigments produce colours by light interference. The important characteristic of these pigments is shift in colour with changing angle of observation. The pigment particles are thin platelets of high refractive index, which partially reflect and partially transmit the incident light. Several iridescent pigments are examined. These include basic lead carbonate, titanium coated mica pigments, iron oxide-mica pigments and combination pigments. Dispersion of iridescent pigments in plastics and applications are discussed. 21 refs.

INDIA

Accession no.844238

Item 46

Brookfield, Ct., SPE,Color & Appearance Div., 2001, 19 papers, pp.178, 27cm, 012

HOT COLORS COOL PLASTICS. PROCEEDINGS OF A SPE RETEC HELD MARCO ISLAND, FL., 23RD-25TH SEPT. 2001

(SPE,Color & Appearance Div.)

Eighteen papers are published following this 3 day regional technical conference. Papers are presented under four main panel discussion groups: weathering; colorant, instrumentation and special effects.

USA

Accession no.843891

Item 47

Composites International
No.48, Nov./Dec.2001, p.16/8
English; French

EUROTINTER: TAILOR-MADE COLOURS FOR GELCOAT USERS

"Eurotinter" is a new process developed over several years by DSM Composite Resins, which automatically pigments gelcoats to a vast number of programmed colours, utilising technology which has been successfully used by the paint industry for some time. It means that moulders of glass-reinforced-plastics can enjoy the benefits of having gel coats delivered ready-pigmented to their exact requirements. Details are given here of the process, its development, and its advantages.

DSM COMPOSITE RESINS
EUROPE-GENERAL; EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; ITALY; UK; WESTERN EUROPE

Accession no.843329

Item 48
Asia Pacific Coatings Journal
14, No.6, Dec. 2001, p.23-4
SPARKLING SILVER, GLEAMING GOLD
Schmidhauser J
Sartomer Co.

The demand for metallic coatings has led to the development of a water-based dispersing resin that can help formulators overcome problems relating to tarnishing in water-based formulations where pH levels are low. This resin has been designed as an alternative to polymers that are only water soluble in high pH, alkaline solutions. It is claimed to disperse metallic pigments in a pH neutral system, eliminating the tarnish typically associated with bronze, copper and other metallic pigments. An overview is included of pigment dispersing resins and their functions in water-based coating formulations, followed by details of the development of amic acid dispersing resins.

USA

Accession no.840520

Item 49
Journal of Coatings Technology
73, No.923, Dec. 2001, p.61-70
COMPARISON OF METHODS TO ASSESS PIGMENT DISPERSION
Van S T; Velamakanni B V; Adkins R R
3M Corp.

Several methods for assessing the dispersion of two pigments in a conventional solvent-based acrylic vehicle for a screen printing ink are compared. The pigments are a perylene red (PR224) and Irgazin DPP red BO (PR 254) and the methods are fineness of grind, contrast ratio measurements for opacity and transparency, colour strength and shade development, gloss, particle size measurement by light scattering, rheology and optical microscopy. 54 refs.

USA

Accession no.839367

Item 50
Injection Molding
9, No.11, Nov.2001, p.54
GLOW-IN-THE-DARK COMPOUNDS ENHANCE EMERGENCY TRUNK RELEASE

An emergency trunk release handle has been produced by Delphi Automotive Systems and is moulded with an LNP Engineering Plastics glow-in-the-dark (GID) compound called Colorcomp Glow that activates quickly. The handles are moulded of a PP base resin with phosphorescent pigments that reportedly activate much faster than traditional GID resins.

LNP ENGINEERING PLASTICS INC.
USA

Accession no.839290

Item 51
European Plastics News
29, No.1, Jan.2002, p.37
STRONG IN COLOURS

Holliday Pigments has launched four new grades of ultramarine blue pigments, a product in which it dominates the European market with a share of some 65 percent. Premier XSR and XSG are extra-strong red and green shades, with DE colour consistency of less than 0.50 and 1.5 percent maximum volatile matter at 105C, while Premier DXSR and DXSG are dry shades with 0.75 and 0.05 percent respectively. Premier XSR and XSG are said to offer unrivalled colour strength, exceptional light fastness and heat strength. They are also non-migratory, non-warping and easy to disperse.

HOLLIDAY PIGMENTS LTD.
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.839239

Item 52
Revista de Plasticos Modernos
81, No.537, March 2001, p.323-9
Spanish
DECORATIVE OR HIGH FINISH COATINGS
Bosch P; Mateo J L; Peinado C
Instituto de Ciencia y Tecnologia de Polimeros

An examination is made of the optical properties required of decorative coatings and of the types of pigments and colourants used to achieve these properties. Formulations for application in the automotive industry and in paper coating are described. 8 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; SPAIN; WESTERN EUROPE; WORLD

Accession no.839081

Item 53
Canadian Plastics
59, No.7, July 2001, p.25-7

SPECIAL EFFECTS WILL BE COMMONPLACE
Macdonald C

The trends for multi-dimensional colour are forecast to continue through 2002 and 2003, so expect to be challenged by more iridescent, ethereal, layered and metallic effects for almost all applications. Fantom Technologies has chosen copper and other pearlescent/ metallic finishes for the palette of its Wildcat line of vacuum cleaners. Engelhard has introduced Vegetable Black Olive pigments. This is a black, mica-based effect pigment with champagne undertones. This extends the range of absorption colours possible with mica-based pigments to brown-black shades. GE Plastics' Visualfx engineering thermoplastics portfolio includes the Interference Effects family, which reflect and refract light so that the perceived colour appears to change with viewing angle.

ENGELHARD CORP.
NORTH AMERICA

Accession no.837872

Item 54
Chemical Week
163, No.41, 7th Nov. 2001, p.29-30
COATING PIGMENTS MARKET LOSES ITS COLOUR. SPECIAL EFFECTS PRODUCTS SHINE
Seewald N

A look is taken at a number of US pigment producers, who have been affected by the slowdown in the US economy and a decline in consumer spending. Interviews from executives of some pigment producers, including Engelhard, Ciba, Clariant and Apollo Colors, who are depending upon new products and formulations to boost growth, especially those developing special-effect pigments, are included along with statistics on the US demand for pigments in 2000.

ENGELHARD; CIBA; CLARIANT; APOLLO COLORS
USA

Accession no.836859

Item 55
Chemical Marketing Reporter
260, No.17, 5th Nov.2001, p.FR6
COLOURED PIGMENTS
Van Arnum P

Total world production of white, black and coloured pigments reached 5.7 million metric tons in 1999, with titanium dioxide accounting for 68%, iron oxide pigments 16%, pigment-grade carbon black 8% and other coloured pigments 8%. The world market value for coloured pigments reached 7.5bn US dollars in 1999, of which inorganic coloured pigments accounted for 2.6bn US dollars and organic pigments 4.9bn US dollars. With a 37% market share, Western Europe is the largest coloured-pigment-producing region, followed by North America at 28% and Asia at 25%.

SRI CONSULTING
WORLD

Accession no.834650

Item 56
Pigment & Resin Technology
30, No.5, 2001, p.325
MELCOPLAST PROVIDE A COLOURFUL FUTURE FOR PLASTICS

Brief details are given of the dye products available from Melcoplast. Mention is made of the company's creation of new dyes with special metallic, pearlescent or transparent effects.

MELCOPLAST
EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; WESTERN EUROPE

Accession no.834002

Item 57
Plastics Technology
47, No.9, Sept.2001, p.31
YELLOW PIGMENTS EXCEL IN COST & PERFORMANCE

Two new yellow pigments for plastics films and moulded packaging, "Engelhard Yellow 6226" and "Engeltone Yellow 1293", are the subject of this small article. Brief details are presented on the properties and applications of the new pigments which are made by Engelhard Corp. in the USA.

ENGELHARD CORP.; CLARIANT CORP.
USA

Accession no.833868

Item 58
K2001: Product Information.
Messe Duesseldorf, 2001, p.43
COLOURING SYSTEM WITH CONCENTRATE AND DOSING PUMP
Holland Colours NV

Holland Colours NV has introduced HolcoPET, a complete colouring system consisting of liquid colour concentrate and dosing equipment, developed for high-volume and continuous PETP bottle production in transparent colours. The colourant is a non-settling liquid dispersion, with maximum pumpability and stability, and is introduced via a specialised dosing pump. The pigment and dyes are built in a fully PETP-compatible, synthetic carrier system. The product line is based on transparent green, blue and amber, with custom colours also available on request. This abstract includes all the information contained in the original article.

EUROPEAN COMMUNITY; EUROPEAN UNION; NETHERLANDS; WESTERN EUROPE

Accession no.833669

Item 59
Plastics Colouring & Pigments 2001: The International Business Conference and Exhibition on Colouring of Thermoplastics.
Basel, Switzerland, 27th-28th June 2001, Paper 15, pp.14
COLOURING OF PLASTICS - FUTURE OUTLOOK
Reynolds A
Applied Market Information Ltd.
(Applied Market Information Ltd.)

Information is presented on the role of colour, status of coloured plastics, such as polyolefins and engineering plastics, and future trends in the colouring of plastics, in the form of charts.

EUROPEAN COMMUNITY; EUROPEAN UNION; SWITZERLAND; UK; WESTERN EUROPE

Accession no.833140

Item 60
Plastics Colouring & Pigments 2001: The International Business Conference and Exhibition on Colouring of Thermoplastics.
Basel, Switzerland, 27th-28th June 2001, Paper 12, p.1-9.
COLOURATION OF PLASTIC MATERIALS BY SPECIAL EFFECTS MASTERBATCH
Eznack R
Polyone Color & Additives Europe
(Applied Market Information Ltd.)

The reasons for using special effects pigments are outlined and the terminology commonly used in the plastics industry with regard to the colouration of thermoplastic materials is defined. An overview of the colouration of plastics materials by masterbatch is presented and the visual effects created by the inclusion of particles in plastics are described in detail. These effects include pearl, interference pearl, variable colour, hologram, phosphorescent, thermochromic. edgeglo, photochromic and marbled effects and visual effects created by modifications of the masterbatch. Recent trends in special effects masterbatch colouring are indicated and some information on PolyOne is given.

EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; SWITZERLAND; WESTERN EUROPE

Accession no.833137

Item 61
Plastics Colouring & Pigments 2001: The International Business Conference and Exhibition on Colouring of Thermoplastics.
Basel, Switzerland, 27th-28th June 2001, Paper 11, pp.12
HOLOGRAPHIC EFFECT PIGMENTS FOR PLASTICS. APPLICATION AS A PAINTED FINISH/APPLICATION IN MASS-COLOURED PLASTICS
Kumar R
Eckart-Werke
(Applied Market Information Ltd.)

Charts are presented with information on hologram definition, the creation of holographic pigments, availability of 12, 23 and 50 micron films (silver and silver/pewter, gold and copper), application as a painted finish, stability in aqueous systems and application in mass-coloured plastics.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; SWITZERLAND; WESTERN EUROPE

Accession no.833136

Item 62
Plastics Colouring & Pigments 2001: The International Business Conference and Exhibition on Colouring of Thermoplastics.
Basel, Switzerland, 27th-28th June 2001, Paper 10, pp.10
METALLIC EFFECTS - NEW PERFORMANCE CRITERIA
Kerr S
Silberline Ltd.
(Applied Market Information Ltd.)

Charts are presented giving information on the production of aluminium pigments, metallic pigment types, methods of incorporation, range of metallic effects, areas of application, suitable processing techniques, flow line issues and performance characteristics.

EUROPEAN COMMUNITY; EUROPEAN UNION; SWITZERLAND; UK; WESTERN EUROPE

Accession no.833135

Item 63
Plastics Colouring & Pigments 2001: The International Business Conference and Exhibition on Colouring of Thermoplastics.
Basel, Switzerland, 27th-28th June 2001, Paper 7, pp.22
OPTIMISING PROFIT THROUGH EFFECTIVE ULTRAMARINE PIGMENTS
Masterman D P
Holliday Pigments Ltd.
(Applied Market Information Ltd.)

The history of the development of Ultramarine is outlined and the characteristics of various grades of Ultramarine are briefly described. Recent developments in Ultramarine pigments, which have focussed on property improvements to enhance their use in plastics processing, are described and the recent advent of low dust grades of Ultramarine, which have led to a number of improvements in the cost-effective colouring of plastics, is highlighted.

EUROPEAN COMMUNITY; EUROPEAN UNION; SWITZERLAND; UK; WESTERN EUROPE

Accession no.833132

Item 64
Plastics Colouring & Pigments 2001: The International Business Conference and Exhibition on Colouring of Thermoplastics.

Basel, Switzerland, 27th-28th June 2001, Paper 6, pp.18

RARE EARTH'S AS HIGH PERFORMANCE PLASTIC PIGMENTS

Bauregard C
Rhodia Electronics & Catalysis
(Applied Market Information Ltd.)

The preparation and properties of rare earth sulphide pigments, such as cerium sulphide, are described. Some examples of cost effective colour matching with these pigments, trade named Neolor, are presented and their suitability as UV absorbers in PP, HDPE and polycarbonate is demonstrated.

EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; SWITZERLAND; WESTERN EUROPE

Accession no.833131

Item 65
Plastics Colouring & Pigments 2001: The International Business Conference and Exhibition on Colouring of Thermoplastics.
Basel, Switzerland, 27th-28th June 2001, Paper 5, pp.23

COMPLEX INORGANIC COLOUR PIGMENT - HIGH PERFORMANCE PIGMENTS FOR PLASTICS

White J P
Shepherd Color Co.
(Applied Market Information Ltd.)

Complex Inorganic Colour Pigments, which are heat-stable colour, process-stable colour, infrared reflective/ low heat build-up dark colours, are described. The performance properties of these pigments are demonstrated and their impact on the environment discussed along with health and safety aspects.

SWITZERLAND; USA; WESTERN EUROPE

Accession no.833130

Item 66
Plastics Colouring & Pigments 2001: The International Business Conference and Exhibition on Colouring of Thermoplastics.
Basel, Switzerland, 27th-28th June 2001, Paper 4, pp.30

FORMULATING FOR VALUE: RANDOM REFLECTIONS ON RED

Sykes R
Ciba Specialty Chemicals Inc.
(Applied Market Information Ltd.)

The most important parameters contributing to value-in-use in the broadest sense are defined by reference to a subset of colourants for plastics and fibres in red colour space. Parameters considered include colour, cost, form, heat resistance, additive interactions, distortion, light fastness, weather fastness, migration, regulatory considerations and brand integrity. The characteristics of principal organic red pigment types for plastics are also described.

SWITZERLAND; WESTERN EUROPE

Accession no.833129

Item 67
Plastics Colouring & Pigments 2001: The International Business Conference and Exhibition on Colouring of Thermoplastics.
Basel, Switzerland, 27th-28th June 2001, Paper 3, pp.20

SOME NOVEL HIGH VALUE-IN-USE COLOURANTS AND INNOVATIVE CONCEPTS FOR THE COLOURATION OF PLASTICS

Kaul B L
Clariant Huningue SA
(Applied Market Information Ltd.)

The requirements for high value-in-use colourants are outlined and some new types of high value-in-use pigments under development at Clariant are described. A range of colourants, including dioxazine pigments, azo pigments, functional colourants, quinacridine pigments and polymer soluble colourants is covered and mention is made of a novel colour delivery system, called Driz-Pearls, for colouring plastics. 32 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; SWITZERLAND; WESTERN EUROPE

Accession no.833128

Item 68
Revue Generale des Caoutchoucs et Plastiques
78, No.793, March 2001, p.32-5
French

PREDICTING THE BEHAVIOUR OF COLOURED MATERIALS

Lemaire J; Siampiringue N; Fromageot D
Centre National d'Evaluation de Photoprotection

The photodegradation of coloured plastics and the influence of pigments and colourants on the degradation process is examined, and the prediction of the long-term behaviour of coloured plastics specimens on the basis of accelerated testing techniques is discussed.

EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; WESTERN EUROPE

Accession no.831338

Item 69
European Coatings Journal
No.10, 2001, p.60/7

PIGMENTS EFFECT MECHANICAL COATING PROPERTIES

Bosch W; Schlesing W; Buhk M
DuPont Herberts Automotive Systems; DuPont Performance Coatings

The effects of pigments on the technological properties and dynamic mechanical properties of automotive coatings

were investigated and pigment-resin interactions analysed by comparing the above properties of the differently pigmented coatings. Technological properties tested included pendulum hardness, tensile strength, elongation at break, cross-cut adhesion, stone chip resistance, humidity resistance and appearance. Three different pigments (an organic red pigment, blue mica pigment and aluminium pigment) were chosen to determine the influence of pigment type and pigment volume concentration on the technological properties of the coatings. 14 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.830461

Item 70
Bristol, Applied Market Information Ltd., 2001,15 papers, 31cm, 012
PLASTICS COLOURING & PIGMENTS 2001: THE INTERNATIONAL BUSINESS CONFERENCE AND EXHIBITION ON COLOURING OF THERMOPLASTIC. PROCEEDINGS OF A CONFERENCE HELD BASEL, SWITZERLAND, 27TH-28TH JUNE 2001
(Applied Market Information Ltd.)

Fifteen papers are published on a variety of topics concerning the colouring of thermoplastics. Papers are divided into four main areas: material developments; additives; pigment material effects and colouring markets.

SWITZERLAND; WESTERN EUROPE

Accession no.829892

Item 71
Machine Design
73, No.13, 12th July 2001, p.76/80
MASTERING COLOR
Blasius B
Clariant Masterbatches
Edited by: Hoffman J M

The use and selection of colourants for plastic parts is discussed. In addition to changing the colour of the plastic part, the use of colourants may also modify its polymer chemistry, physical properties, manufacturability, and cost. Factors to be taken into consideration by designers in choosing colourants are examined, and include choice of masterbatch carrier, pigment dispersion, interfacial adhesions between resin and pigment, the effect of dispersing agents, the possible dehalogenation of substituted dyes and pigments, choice of dyes or pigments, basic resin variations, dye migration, pigment solubility, and pigment/resin interactions at high temperatures.

USA

Accession no.828599

Item 72
Polymer Engineering and Science
41, No.7, July 2001, p.1099-106
EFFECT OF FEEDING MODE ON DISPERSIVE MIXING EFFICIENCY IN SINGLE-SCREW EXTRUSION
Elemans P H M; van Wunnik J M
DSM Research

Experimental studies were conducted of the problems encountered when dispersing pigments (ultramarine blue) in polybutylene terephthalate (DSM Arnite T06-200). In the case of these dry colour compounds, where polymer pellets were coated with a pigment powder, the latter tended to form agglomerates during extrusion, owing to the hydrostatic pressure that prevailed in the screw channels. In single-screw extruders, this pressure was due to the Coulombic frictional transport in the solids conveying zone. The formation of agglomerates could be prevented to a significant extent by operating the extruder in an underfed mode. The results could be applied to other compounds where a fine dispersion of solids in polymers was required. 15 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; NETHERLANDS; WESTERN EUROPE

Accession no.827252

Item 73
Antec 2001.Conference proceedings.
Dallas, Texas, 6th-10th May, 2001, paper 340
CONFOCAL LASER SCANNING MICROSCOPY OF PIGMENTED POLYPROPYLENE SYSTEMS FOR DISPERSION EVALUATION
Nielsen E C
Techmer P.M.
(SPE)

Confocal laser scanning microscopy may be used to evaluate the dispersion of pigments in the production of colour concentrate masterbatches, by establishing the presence of agglomerates in the pellet form as an alternative to blowing film from diluted material. The technique was used to study the dispersion of four different pigments in polypropylene, dispersions being prepared using a co-rotating twin screw extruder. There was good agreement with results from agglomerate counts on blown film samples. It was concluded that the technique required limited sample preparation and was easy to use. Superior dispersion was obtained using a two-step dispersion process. 10 refs.

Accession no.825964

Item 74
Plastics Additives & Compounding
3, No.7/8, July/Aug. 2001, p.18-25
COLOURING PLASTICS: FUNDAMENTALS AND TRENDS
Abrams R; Ali M; Denton P; Igualada J; Groen M; Gschwind E
Ferro Corp.

An overview is presented of the technology relating to the colouring of plastics. The fundamental nature of colour

and the mechanism by which it manifests itself in its different forms is examined with respect to the interaction between the illuminant, the object and the observer. Colour measurement and matching techniques are discussed, and differences between visual and computer controlled colour-matching procedures are listed. Types of pigments used are described and the effect of dispersion and distribution of colourants in plastics is considered. The use of colour concentrates to produce plastics with desired colour, optical effects and specific physical properties is discussed.

USA

Accession no.825854

Item 75

Plastics Additives & Compounding

3, No.7/8, July/Aug. 2001, p.16-7

GLOW-IN-THE-DARK COMPOUNDS OFFER NEW OPPORTUNITIES

LNP Engineering Plastics' glow-in-the-dark Colorcomp compounds are being used by Delphi Automotive Systems for a range of automotive emergency car boot internal release handles. According to the company, these were developed in response to a new federal safety regulation in the US. The handles are made from PP and phosphorescent pigments that are claimed to activate much faster than traditional glow-in-the-dark compounds. Details are given of the performance and properties of high intensity Colorcomp glow compounds and raid charge Colorcomp compounds. The former are capable of glowing up to ten times longer and brighter than standard phosphorescent compounds. Other potential applications for the compounds are suggested.

LNP ENGINEERING PLASTICS; DELPHI AUTOMOTIVE SYSTEMS

USA

Accession no.825853

Item 76

Japan Chemical Week

42, No.2131, 19th July 2001, p.7

LEGAL CONTROL GOES INTO FORCE; REQUIRING SAFETY MANAGEMENT

In 2000, Japanese production of insoluble azo pigments was up 6.4% year-on-year, and that of soluble azo pigments, up 7.8%. Azo pigments constituted about 57% of total organic pigment production. The production of phthalocyanine pigments, which commanded a 41% share of total organic pigment production, was up 4.4%. The overall production of organic pigments was up 5.7% year-on-year to 36,309 tons. Due to safety reasons, coloured inorganic pigments are increasingly being replaced by organic pigments. Total production of coloured inorganic pigments was down 9.4% year-on-year.

JAPAN

Accession no.825521

Item 77

Antec 2001.Conference proceedings.

Dallas, Texas, 6th-10th May, 2001, paper 286

EFFECT OF PHTHALOCYANINE BASED PIGMENTS ON THE CRYSTALLINITY AND MECHANICAL PERFORMANCE OF CHILL ROLL CAST POLYPROPYLENE EXTRUDED SHEET

Marks A; McNally G M; Murphy W R; Leathem M

Belfast,Queen's University; Orr S.,Ltd.

(SPE)

Non-pigmented polypropylene film, and films containing 2% phthalocyanine-based and iron oxide-based pigments were produced by the chill role cast extrusion process, using a range of quench temperatures and die to chill roll gaps. The tensile modulus of the phthalocyanine-pigmented film was up to 25% higher than that of non-pigmented and iron oxide-pigmented films. The quench roll temperature had greater influence on the crystallinity of non-pigmented and iron oxide-pigmented film then it did on that of phthalocyanine-pigmented films, which had significantly smaller spherulite sizes. 9 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.825382

Item 78

Revista de Plasticos Modernos

80, No.533, Nov.2000, p.484/6

Spanish

APPLICATIONS OF LIQUID COLOURANTS

Applications of liquid colourants supplied by Colormatrix Europe in plastics packaging, fibres and PVC extrusion are described. Developments by the Company in feeding and quality control systems are also reviewed.

COLORMATRIX EUROPE

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.825295

Item 79

Asia Pacific Coatings Journal

14, No.3, June 2001, p.36

KEEPING AN EYE ON LEGISLATION

Smith H

Sun Chemical Corp.

The potential effect of proposed US and European legislation on the global pigments industry is discussed. US legislation relating to wastes from the manufacture and use of azo pigments and dyes is considered and the European Commission's plans to extend the present system of pre-marketing testing of all new substances are examined. The possibility of bisphenol A being an endocrine disrupter is discussed, together with the effect on the pigment industry of the treaty signed by officials for the US, EU and 90 other countries to eliminate or

minimise the production and use of twelve persistent organic pollutants, including polychlorinated biphenyls, dioxins and furans.

EUROPEAN COMMISSION
EU; EUROPEAN COMMUNITY; EUROPEAN UNION; USA; WESTERN EUROPE-GENERAL

Accession no.824911

Item 80
Materiale Plastice
38, No.2, 2001, p.88-92
Rumanian
EFFECT OF SOME AZO DYES ON POLYPROPYLENE STABILITY TO THERMOOXIDATION
Dumitrescu C; Gorghiu L M; Olteanu R L; Jipa S; Mihaila T C

The effect of colourants in a concentration of 0.15 wt.% on the heat stability of isotactic PP was investigated by chemiluminescence. Kinetic parameters, namely oxidation induction time, half life time of degradation and maximum oxidation time were determined and the effects of oxidation rate and activation energy on the propagation of thermal degradation investigated. Synergism between colourants (mono and diazo compounds) and Irganox 1076 was observed and a mechanism of stabilisation involving colourant and antioxidant developed based on the acidic behaviour of these compounds relative to peroxy radicals. 11 refs.

EASTERN EUROPE; RUMANIA

Accession no.824850

Item 81
Antec 2001.Conference proceedings.
Dallas, Texas, 6th-10th May, 2001, paper 217
EFFECT OF PIGMENT TYPE AND CONCENTRATION ON THE RHEOLOGICAL PROPERTIES OF POLYPROPYLENE
Marks A F; McNally G M; Murphy W R; Orr P
Orr S.,Ltd.; Belfast,Queen's University
(SPE)

The rheological properties of pigmented polypropylene were measured using a dual capillary rheometer, over the temperature range 190-230 C, and the shear rate range 10-800 /s. The pigments were titanium dioxide, iron oxide and phthalocyanine blue, at concentrations of 0.2-3.0%. Considerable increases in apparent viscosity were observed, even at relatively low pigment loadings, the increase being greater at lower shear rates. From the activation energies calculated from the rheological data, it is proposed that the observed changes were due to pigment-nucleated melt crystallisation. 8 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.823716

Item 82
Plastics Technology
47, No.8, Aug.2001, p.27
NEW PHOSPHORESCENT PP HELPS CHILD SAFETY

LNP Engineering Plastics has formulated rapid-charge or fast activating phosphorescent pigments into a new PP compound. The glow-in-the-dark pigments store energy from ambient light six to seven times faster than conventional phosphorescent pigments, so that shorter light exposure is needed to activate them. Delphi Automotive Systems is using the new ColorComp compound to mould an emergency release handle designed to prevent children from being trapped inside a car trunk. This abstract includes all the information contained in the original article.

LNP ENGINEERING PLASTICS INC.
USA

Accession no.823323

Item 83
LOOKING GOOD - BETTER BUSINESS RESULTS THROUGH COLOUR AND PRINT. Proceedings of a conference held Shawbury, UK, 26th September 1996. Shawbury, 1996, Paper 4, p.1-2. 012
LIQUIDS VERSUS SOLIDS IN THE COLOURATION OF PLASTICS
Brotherton L
Metacol Ltd.
(Rapra Technology Ltd.)

Metacol's liquid colour technology is briefly described, the advantages of liquid colours over solid colourants are briefly discussed and one industry, the structural foam moulding industry, to benefit from the use of liquid concentrate is highlighted.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.823051

Item 84
LOOKING GOOD - BETTER BUSINESS RESULTS THROUGH COLOUR AND PRINT. Proceedings of a conference held Shawbury, UK, 26th September 1996. Shawbury, 1996, Paper 1, p.1-3. 012
CHOOSING A COLOUR SYSTEM: THE MATERIALS/MACHINE MIX
Lee R H
Colormax Ltd.
(Rapra Technology Ltd.)

The advantages and disadvantages of methods available for colouring plastics, including dry colouring, compound colouring, liquid colouring and masterbatch colouring, are summarised. Equipment options and end-use applications are indicated and factors, which need to be taken into account in order to profit from on-machine colouring, are considered.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.823048

Item 85
ENHANCING POLYMERS USING ADDITIVES AND MODIFIERS II. Proceedings of a conference held Shawbury, UK, 14th November 1996.
Shawbury, 1996, paper 3, p.1-6. 012
ENHANCING POLYMERS USING METAL PIGMENTS
Wheeler I R
Silberline Ltd.
(Rapra Technology Ltd.)

The range of metallic pigments available and their unique properties are described and the ways in which these pigments can add value and aesthetic appeal to polymers are demonstrated. Guidelines for obtaining the best possible visual effects are presented and some non-aesthetic applications of these pigments are identified.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.823002

Item 86
Antec 2001.Conference proceedings.
Dallas, Texas, 6th-10th May, 2001, paper 119
EFFECT OF PIGMENT TYPE AND CONCENTRATION ON THE MECHANICAL PERFORMANCE OF INJECTION MOULDED METALLOCENE CATALYSED POLYETHYLENES
Murphy M J; McNally G M; Kearns M P
Belfast,Queen's University
(SPE)

Linear low density octene- and hexene-metallocene catalysed polyethylenes and a conventional linear low density polyethylene, containing 0.05-0.5% ultramarine blue or phthalocyanine green pigment, were injection moulded, and the moulded samples characterised by determination of crystallinity, dynamic mechanical thermal analysis, and by measurement of tensile and impact properties. The introduction of pigment gave a significant reduction in impact properties of the metallocene polyethylenes at both room temperature and at -40 C, dependent upon pigment type and concentration. Increases in tensile and dynamic modulus were also observed, dependent upon pigment concentration and the metallocene olefin comonomer type. The pigmented materials also exhibited a significant increase in crystallinity. 4 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.822868

Item 87
Polymers Paint Colour Journal
191, No.4439, April 2001, p.18-20
TAKING A SHINE
Harding P
Wolstenholme International Ltd.

Vacuum metallised pigments are discussed with reference to their manufacture, properties of the flake, full opacity, effect of application, formulation changes, improvement of chemical resistance, printing and other applications, and the brilliant final finish obtained. It is shown that the high surface areas of these pigments allow low levels of pigment to be used to produce opacity and that the topcoat should be of minimum thickness because it detracts from the metallic brilliance of the finish.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.821737

Item 88
Polymer Degradation and Stability
70, No.1, 2000, p.77-80
SYNTHESIS AND PHOTOSTABILITY OF AN UNSATURATED 9-PHENYLXANTHENE DYE AND ITS COPOLYMERS WITH METHYLMETHACRYLATE
Konstantinova T; Cheshmedjieva-Kirkova G
Sofia,University of Chemical Technology & Metallurgy

An unsaturated 9-phenylxanthene dye was synthesised using phase transfer catalysis. Bulk copolymerisation of the dye with methyl methacrylate was carried out using AIBN as initiator. Unreacted monomers were removed and the polymers retained their colour and fluorescence, showing that the dye was covalently bonded to the polymer. The effect of the dye on the rate of polymerisation was studied. 6 refs.

BULGARIA; EASTERN EUROPE

Accession no.819231

Item 89
Advances in Polymer Technology
20, No.2, Summer 2001, p.116-24
ROTATIONALLY MOULDED POLYETHYLENE: STRUCTURAL CHARACTERISATION BY X-RAY AND MICROHARDNESS MEASUREMENT
Cramez M C; Oliveira M J; Fakirov S; Crawford R J; Apostolov A A; Krumova M
Minho,Universidade; Belfast,Queen's University; Sofia,University

Rotationally moulded PE blended in two ways (turbo blending and extrusion) with nucleating and non-nucleating pigments is structurally characterised by wide- and small-angle x-ray scattering (WAXS and SAXS, respectively), DSC and microhardness measurements. Morphological observations are performed by polarised light microscopy. Melt temperature and degree of crystallinity (from both DSC and WAXS) remain essentially constant regardless of sample preparation and type of pigment. The same holds for the crystal sizes from

WAXS and the lamella thickness from SAXS. Only the values of microhardness depend on the type of pigment, increasing about 10% when a nucleating type is used. The almost constant values of these properties, contrasting to the spherulitic morphology, are explained by the fact that the processing conditions in rotational moulding are very favourable for crystallisation. As a consequence, optimal crystalline structure is achieved, which masks significantly the effect of pigments and blending conditions on the crystallisation behaviour of PE. 20 refs.

BULGARIA; EASTERN EUROPE; EUROPEAN COMMUNITY; EUROPEAN UNION; PORTUGAL; UK; WESTERN EUROPE

Accession no.818014

Item 90
British Plastics and Rubber
May 2001, p.10-1
ANY COLOUR AS LONG AS IT'S GREEN
Hampton D
Hampton Colours Ltd.

It is briefly reported that Hampton Colours has been asked to supply colourants for biodegradable plastics. When the polymer degrades, it releases the pigments that were previously encapsulated in the polymer directly to the environment. The company has developed a range of colours available as masterbatch or dry colourant based on what is believed to be environmentally acceptable pigments. This sort of pigment generally gives excellent heat and light fastness.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.816693

Item 91
Plastics Additives & Compounding
3, No.3, March 2001, p.36/42
PIGMENTS: COLOURS AND SPECIAL EFFECTS

A review is presented of product offerings from some leading pigment manufacturers supplying colours and special effects for plastics. Product developments from Avecia, BASF, Bayer, Ciba, Clariant, DayGlo, Eckhart, Engelhard, Ferro, Holliday Pigments, Merck, Silberline, and Sun Chemical are reviewed.

WORLD

Accession no.815473

Item 92
Informations Chimie
37, No.421, Sept.2000, p.84-7
French
SPECIAL EFFECTS PAINTS DIVERSIFY INTO THE DECORATION MARKET

A review is presented of developments in decorative paint formulations in which different types of pigments and fillers are used to achieve special visual effects. Paints and pigments developed by a number of companies are examined.

WORLD

Accession no.814856

Item 93
Modern Plastics International
31, No.4, April 2000, p.50-1
COLOUR AND COLOUR CONTROL

The trend towards metallic pigments is driven by technology, since their use in products via moulded-in colour reduces costs versus coatings. The emphasis on metallic colourants stems from a general trend towards the fashionable extreme colours. Teknor Apex has introduced two-tone colours, Flip-Flop Pearlescents, that reflect different shades when viewed from different angles. A product from Clariant, Splash, permits the moulding of random effects that imitate wood and marble. Meanwhile, the industry is developing ways to utilise computers and the Internet to better use colour information, especially in global business.

WORLD

Accession no.814465

Item 94
Revista de Plasticos Modernos
80, No.529, July 2000, p.38-46
Spanish
PIGMENTS AND COLOURANTS IN POLYMERS
Catalina F; Santamaria R; Bosch P; Peinado C
Instituto de Ciencia y Tecnologia de Polimeros

The main types of pigments and colourants used in polymers are reviewed and classified according to their interaction with incident light. The advantages and limitations of individual families of pigments and colourants are discussed, and the types of polymers in which they are used are examined. 12 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; SPAIN; WESTERN EUROPE

Accession no.812733

Item 95
Patent Number: EP 1086984 A2 20010328
COMPOUNDS FOR MASS COLOURATION OF POLYMERS
Feiler L; Hao Z
Ciba Specialty Chemicals Holding Inc.

Soluble pigment precursors possessing not only higher heat stability but also improved solubility for use in the mass colouration of high temperature polymers are disclosed. A formula for these pigment precursors, which include a chromophore of the quinacridone, anthraquinone, perylene, indigo, quinophthalone, indanthrone, isoindolinone, isoindoline, dioxazine, azo, phthalocyanine or diketopyrrolopyrrole series, is given.

EUROPEAN COMMUNITY; EUROPEAN UNION; SWITZERLAND; WESTERN EUROPE; WESTERN EUROPE-GENERAL

Accession no.812280

Item 96
Polymers Paint Colour Journal
197, No.4438, March 2001, p.41/4
LOOKING ON THE BRIGHT SIDE
Meier M
Ciba Specialty Chemicals Inc.

Communicating by colour is becoming important in business, and coil coating is reported to be tapping into this trend. The amount of suitable pigment chemistries is wide. Despite their limitations, organic pigments offer special characteristics. The saturated colour cannot be achieved by iron oxide and mixed metal oxide pigments. However, the colour space covered by organic pigments and inorganic pigments, such as lead chromates, molybdate orange and bismuth vanadate types, is larger. Organic pigments have higher intrinsic strength than lead chromes and molybdate orange pigments. This means they are more suitable for use as shading compounds for paint formulations. There is some toxicological concern about lead chromates and molybdate oranges. In some countries, legislation restricts, or even bans, the use of these chemistries. It is described how pigment manufacturers must create a range of products that can keep up with the demands of producing bright colours using the coil coating application method.

SWITZERLAND; WESTERN EUROPE

Accession no.810903

Item 97
Plastics Additives & Compounding
3, No.4, April 2001, p.9
COMPOUNDING OFFERS BETTER UV PROTECTION

Studies undertaken by AEI Compounds indicate that supplier compounded black plastic can offer superior UV protection to that gained by conventional extrusion-added masterbatches. In insulated overhead cables, the insulation is typically a crosslinked PE containing 2.5% carbon black. The carbon black screens out UV light from sunlight that would otherwise lead to rapid degradation of the material. AEI Compounds adds that in order for this to work efficiently, it is essential that only the smallest particles of carbon black are used. In turn, these particles must be uniformly dispersed within the PE substrate. In tests, the company claims that even the best masterbatch-mixed combination did not provide the UV performance of the better pre-dispersion in the compounded materials.

AEI COMPOUNDS

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.810096

Item 98
Plastic Solutions International
2000, p.22
PIGMENTS FOR PLASTICS
Eckart-Werke GmbH & Co

Though its diversified range of products the Eckart group has for many years been one of the biggest suppliers of effect pigments to the plastics industry. The pigments most widely used in plastics are aluminium pigments. These are available in particle sizes from 5-225 mu and in three different delivery forms. Depending on the particle size, a highly opaque colouring, a typical metallic finish of a sparkle effect finish will be achieved. Gold bronze grades are produced in four different copper/gold shades, thus enabling users to give their moulded items a very particular finish. PVC applications, or those that need higher temperatures while moulding, require a coating for the pigments to protect them against darkening or colour changes. The silica-coated resist grades of both aluminium and gold bronze pigments have a sufficient stability in these media. Details are also given of the company's Resist grades, Flonac pearlescent pigments and a range of holographic pigments. Brief details are given.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.809587

Item 99
Plastic Solutions International
2000, p.16-7
THERE'S MORE TO COLOUR THAN MEETS THE EYE
Quinn G
GE Plastics

Colour is a major topic among OEMs, and, driven by two big concerns, it is gaining in importance. Increasingly, manufacturers across a broad spectrum of industries are finding they need to come to terms with two emerging trends: faster colour development and the need to manage colours they have already chosen. Starting primarily in the computer and business equipment markets, there is a clear trend towards creating more aesthetically appealing products. Where once two colours (beige and black) would suffice, now manufacturers and customers want vibrant and unique colour eye-catching design, and arresting effects such as sparkle, angular metamarisms, diffusions, translucence and more. OEMs want the product's appearance to capture the customer's eye and provoke positive comments. The challenge now is how fast can a new colour that will appeal to the customer be found and verified? Some emphasis is placed on services provided by GE Plastics' Colorxpress Colour Management Programme.

USA

Accession no.809584

Item 100
Injection Molding
9, No.2, Feb.2001, p.48-9
THE MATERIALS ANALYST: PART 40. THE HIDDEN EFFECTS OF COLOUR (PART 2)
Sepe M
Dickten & Masch Mfg.Co.

An examination was made of the hidden effects of colour on moulded propylene copolymer parts, which incorporated a living hinge and had been coloured blue and had developed a sudden loss in ductility. Tests were carried out to determine the effect of the colour concentrate on product performance, the impact strength of the failing blue products, the crystallinity of the propylene copolymer and the influence of cooling of the parts after moulding. It was found that an increased level of crystallinity in the blue material resulted in a stronger and stiffer product but also a more brittle material and that the blue pigment system acted as a powerful nucleating agent on the propylene copolymer, resulting in a decrease in impact strength.

USA

Accession no.809580

Item 101
Addcon World 2000. Conference proceedings.
Basel, Switzerland, 25th-26th Oct.2000, paper 13
ADDING VALUE WITH METALLIC PIGMENTS
Wheeler I R
Silverline Ltd.
(Rapra Technology Ltd.)

Adding value cost effectively is uppermost in every product designer's mind in today's extremely competitive marketplace. Of the twin attributes of a retail article, namely design and functionality, initial customer perception is more influenced by the former. In buying a new car for example, first impressions will be of shape and colour, before rate of acceleration or fuel economy. Colour is known to be a very important influence on customer choice. With the inevitable translation of automotive styles into the wider range of retail goods, there has never been a better time to consider adding value with metallic pigments. Aspects covered include properties, application, sources of added value, mass pigmentation challenges, adding value by skilful formulation, adding value by good incorporation technique, adding value by equipment optimisation, adding value through new pigment developments, and some examples. 9 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.807854

Item 102
World Plastics Technology
2000, p.19
MASTERS IN SPECIAL EFFECTS

Clariant Masterbatches Division's developments in special effect colourants are described. The company has developed a number of special effects colour masterbatches that have been used to establish a competitive edge for its customers. These include what is claimed to be the industry's first anodised aluminium look, which is said to be ideal for HDPE applications in the personal care packaging industry. Translucent masterbatches for the cosmetics industry, and metallic effects for the sorts and leisure industries are also reported. In addition, Clariant has developed a laser system for plastics applications requiring expiration dates, lots numbers etc. It is a colour laser marking system, formulated to improve the colour marking of PETP, PBTP, PC, PS, POM, TPU, HDPE, PP, LDPE, LLDPE, nylon and acetal resins.

CLARIANT MASTERBATCHES

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.806018

Item 103
Injection Molding
9, No.1, Jan.2001, p.42/6
MATERIALS ANALYST. XXXIX. HIDDEN EFFECTS OF COLOR. I.
Sepe M
Dickten & Masch Mfg.

The moulding-in of colour during injection moulding is discussed with reference to the unanticipated effects of adding colour to a product during the moulding process. Particular attention is paid to the moulding of a thin-walled polycarbonate product for the hand-held electronics market. The effects of pigments on attempts to meet the desired melt flow rate specifications are described, calculation of residence time is outlined and the effects of colours on the thermal stability of polycarbonate are examined.

USA

Accession no.805088

Item 104
Your Ticket to Outstanding Color and Additives.
RETEC 2000. Conference proceedings.
Washington, D.C., 17th-19th Sept.2000, paper 20
USING NEW HIGH PERFORMANCE COLOR SHIFT PIGMENTS TO CREATE DRAMATIC COLOR EFFECTS
Parker B
Flex Products Inc.
(SPE)

The use is discussed of high performance light interference pigments which feature colour shifting behaviour for dramatic colour effects in consumer products to provide product differentiation, etc. Dynamic

colour performance is matched by properties such as shear stability and heat stability. The application, cost and colour performance of these pigments are discussed, and the mechanism of light interference colour is described.

USA

Accession no.804354

Item 105

Your Ticket to Outstanding Color and Additives.
RETEC 2000. Conference proceedings.
Washington, D.C., 17th-19th Sept.2000, paper 19

TROUBLE FREE FLUORESCENT COLORANTS FOR OLEFINS

Newbacher C
Day-Glo Color Corp.
(SPE)

Fluorescent pigments, have historically been subject to a number of processing limitations in terms of limited thermal stability and the potential release of formaldehyde in normal temperature processing conditions. Non-formaldehyde fluorescent dye carrier systems for polyolefins have been developed, based on the reaction of polyfunctional amines with polyfunctional carboxylic acids to form relatively oligomeric polyamides. Such products have since been modified with ester components to improve olefin compatibility. Details are given of a new fluorescent Prill technology which consists of three blending colours: polyester/amide yellow, polyester/amide pink, polyester/amide magenta and polyester/amide clear. These products offer a dust and formaldehyde-free alternative to traditional benzoguanamine based pigments. Tests are carried out which indicate superior heat resistance and plate-out properties when compared with other technologies. In addition, they do not require the use of expensive and difficult to use additives. Prill technology has demonstrated superior resistance to metal-containing additives and catalyst residues. 5 refs.

USA

Accession no.804353

Item 106

Your Ticket to Outstanding Color and Additives.
RETEC 2000. Conference proceedings.
Washington, D.C., 17th-19th Sept.2000, paper 15

SHORT HISTORY OF HIGH PERFORMANCE PIGMENT USAGE IN PLASTICS

Zamoyski A
Clariant Corp.
(SPE)

An historical review of the use of pigments for colouring plastics is presented. Growth in plastics developments in the 1920s led to developments in pigment technologies as colour became increasingly more important to the plastics industry. A listing is included of the most significant high performance pigments used in plastics, arranged according to the year of their initial discovery. More recent developments are discussed, and two examples of new pigment technologies include the triphendioxazine molecule which when commercialised, will yield red violet to blue shades, and thiazine-indigo pigments, currently in the latter stages of development, and which will supply new oranges and reds. 17 refs.

USA

Accession no.804349

Item 107

Your Ticket to Outstanding Color and Additives.
RETEC 2000. Conference proceedings.
Washington, D.C., 17th-19th Sept.2000, paper 2

WORKING ADVANTAGES OF PRILL COLORS

Thompson B
Bayer Corp.
(SPE)

The effect of microscopic particle size on the performance of organic pigments is discussed, and the use is described of a new visualisation technique called two photon laser microscopy which has been found to be useful in the evaluation of the distribution of pigment particles in a polymer matrix, and for correlating performance with physical characteristics. The technique uses the power of the pigment's fluorescence in combination with a solid tunable laser, to monitor the distribution and the degree of aggregation of pigment particles in the plastic matrix. A process has been developed to produce a microgranulate form of organic pigments with the colouration of engineering thermoplastics in mind. These microgranulates are claimed to offer significantly better dry flow characteristics combined with higher bulk densities. and better handling properties than the traditional powder versions.

USA

Accession no.804336

Item 108

Your Ticket to Outstanding Color and Additives.
RETEC 2000. Conference proceedings.
Washington, D.C., 17th-19th Sept.2000, paper 1

WORKING WITH ORGANIC PIGMENTS IN RED COLOR SPACE

Reinicker R; Jaffe E E
Ciba Specialty Chemicals
(SPE)

Colourants in red colour space are discussed, with reference to their properties and suitability for use in colouring plastics and synthetic fibres. Discussion is limited to that area of colour space using a D6500 light source between a hue angle of 340 degrees (bluish red or magenta) to 30 degrees (yellowish red) with chroma of a least 40 in order to avoid the less chromatic pigments generically referred to as browns, and to organic pigments. Properties to be considered in formulating decisions are examined, and include heat stability, light and weather

fastness, migration, solubility, standard depth of shade, compaction, additive interactions, distortion, opacity and transparency, and regulatory considerations. Red pigments meeting these criteria are listed.

USA

Accession no.804335

Item 109

Antec 2000.Conference proceedings.
Orlando, Fl., 7th-11th May, 2000, paper 513

ENHANCING DRY-COLOUR EFFICIENCY IN STARVE-FED INJECTION MOULDING

Elemans
DSM Research
(SPE)

Improvements in pigment dispersion when injection moulding dry colour compounds was investigated using poly(butylene terephthalate) pellets coated with 2% ultramarine blue pigment powder. The injection moulding machine had a standard three-zone screw. Plates were moulded using flood feeding, and also by starve feeding. The latter was achieved using a vibrating feeder, which provided feed only whilst the screw was rotating, and no feed during the injection phase. The output was regulated so that the screw channel was partially filled, giving an enhanced plasticating time compared with flood-fed operation. The starve-fed samples exhibited fewer surface pigment agglomerates, which was attributed to the increased plasticating time, and also to the pressure build-up which causes agglomeration occurring further along the screw, where the pigment has had chance to be wetted by the polymer. 7 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; NETHERLANDS; WESTERN EUROPE

Accession no.803360

Item 110

Plastics Additives & Compounding
2, No.10, Oct. 2000, p.9

CIBA INTRODUCES NEW PIGMENTS FOR PLASTICS AND FIBRES

Applications and product characteristics are briefly described for two new pigments launched by Ciba Specialty Chemicals. Irgacolor Yellow 2GTF is a green-shade of yellow bismuth vanadate pigment, which has been developed to meet demands placed on the masterbatch manufacturer and synthetic fibre producer by the trend towards finer fibres and the need for better dispersibility. Cromophtal Yellow 3RLP is a red-shade yellow isoinolinone pigment, also with good dispersibility and fastness properties, which has potential for application in flexible PVC marking films, rigid PVC profiles, artificial leather and PP fibres.

CIBA SPECIALTY CHEMICALS

Accession no.799800

Item 111

Plastics Additives & Compounding
2, No.11, Nov. 2000, p.30-1

PEARL LUSTRE PIGMENTS GIVE PLASTICS AN EDGE

Pearl lustre pigments from Merck are described. The company's range of pearl lustre Iriodin pigments are based on mica, which when coated with a fine layer of titanium dioxide, provide transparent, silver-white pigments with a soft, deep-seated shine, characteristic of mother-of-pearl. By varying the particle size of the pigments, both glittering and silky-matt lustre effects can be created. In addition, the addition of iron oxide to the titanium dioxide coating can produce a wide palette of brilliant gold shades. Merck is currently working on a new generation of pigments called Colorstream, which use synthetic material in place of mica as the substrate. When used in conjunction with a highly reflective coating the pigment undergoes a pronounced change in colour or colour shift, depending on the direction of the light and the viewing point. Other developments discussed, include WM8 pearl lustre masterbatches and the use of Iriodin pigments in laser marking.

MERCK KGAA

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.799793

Item 112

Plastics Additives & Compounding
2, No.9, Sept. 2000, p.10

NEW ULTRAMARINE PIGMENT IS SUITABLE FOR PET

A new ultramarine pigment, suitable for PETP colouring is announced from Holliday Pigments. Premier DFRX has a very fine particle size, which allows it to be used in transparent PETP packaging. It has been developed specifically for the bottle market, where moisture dispersion and clarity are key issues when using inorganic pigments. Brief product details are given.

HOLLIDAY PIGMENTS

Accession no.799503

Item 113

Plastics Additives & Compounding
2, No.6, June 2000, p.11

BASF LAUNCHES NEW BLUE PIGMENT

Sicopal Blue FK 4266 is a new blue grade pigment, launched by BASF Corp. to complement its Sicopal Blue K 6310. It is a cobalt aluminium oxide pigment, which meets the FDA requirements for indirect food contact. It is reported to be cleaner and redder than the previous corresponding pigment grade offered by the company, and has been designed for use in applications where cobalt blue previously had to be shaded with an ultramarine blue to obtain very reddish, high chroma shades.

BASF CORP.
USA

Accession no.799462

Item 114
Plastics Additives & Compounding
2, No.9, Sept. 2000, p.14
COLOUR CHANGE COMPOUNDS OFFER INCREASED SAFETY

LNP Engineering Plastics has developed new speciality thermoplastic colour compounds that change colour when exposed to body temperatures at around 31 degrees C or a hotter temperature of 45 degrees C. Colorcomp thermochromic compounds are created by adding thermochromic pigments to low temperature resins such as PP or TPEs. The compounds are particularly suitable for applications where heat-induced colour changing can be an added safety feature. Examples of potential applications are briefly given.

LNP ENGINEERING PLASTICS
USA

Accession no.799361

Item 115
Plastics Additives & Compounding
2, No.9, Sept. 2000, p.12
NIMEX METALLIC COLOUR REDUCES KNIT LINES

Details are briefly given of a new line of no-knit metallic colour concentrates from the Plastics Colorants Division of Ferro Corp. Called Nimex, the metallic colour concentrates are claimed to significantly reduce knit lines in injection moulded products. Turbulence in the injection moulding process causes conventional metallic materials to align vertically, creating surface lines of colour on the finished product. Nimex products uses new technology which creates uniform distribution of metallic colours, and eliminates the need for manufacturers to apply primers and liquid paint.

FERRO CORP.,PLASTICS COLORANTS DIV.
USA

Accession no.799357

Item 116
Antec 2000.Conference proceedings.
Orlando, Fl., 7th-11th May, 2000, paper 283
ADDING VALUE TO ROTATIONAL MOLDINGS WITH COLOR & SPECIAL EFFECTS
Henwood N
Just Roto Inc.
(SPE)

Pigments may be incorporated into a rotational moulded parts by: dry blending the pigment with the powder polymer, or by melt mixing of pigment and polymer followed by pulverisation. These techniques are evaluated in terms of the mouldability of the coloured polymer, and the aesthetics and impact properties of the product. Dry blending is a relatively low-cost and offers flexibility as a range of colours may be mixed on-site, whereas pre-mixed colour gives enhanced properties and consistency to the product but is more expensive, and is less flexible if mixing facilities are not available on-site.

USA

Accession no.798565

Item 117
Plastics Additives & Compounding
2, No.5, May 2000, p.12
POLYMER SOLUBLE COLORANTS LAUNCHED

Ciba Specialty Chemicals has introduced a new range of polymer soluble colourants it is announced, which have been designed for use in styrenic and engineering plastics. The Oracet colourants are reported to have good processing behaviour and good fastness properties, with highly transparent shades. Their development is claimed to be a result of the exploitation of synergies between dyes and pigments expertise in the recently formed colours division. Oracet Orange LGP is the first product to be based on a completely new type of isoxindigo chemistry.

CIBA SPECIALTY CHEMICALS
Accession no.798264

Item 118
Injection Molding
8, No.11, Nov.2000, p.52
NEW RESIN ELIMINATES PAINT FOR MOULDED EXTERIORS

GE Plastics' new polymer, Sollx, was developed for weatherable exterior surfaces in automotive and marine markets. Currently, the new material is available in film form only and is being tested at all major OEMs as a film insert for injection moulded body panels. Sollx film is a multilayer product with colour and metallic effects located on separate layers for depth. GE has also developed Ares, a new effect which contains very small metal flakes, barely visible to the eye, that reportedly produce a continuous metallic surface. Resins with the effect are initially available in Lexan polycarbonate in eight standard colours or optional custom colours.

GE PLASTICS
USA

Accession no.797199

Item 119
Patent Number: EP 1043365 A1 20001011
POLYMERIZABLE 1,2-DIPYRAZOLYLETHENES AS DYES FOR OPHTHALMIC PLASTIC LENSES
Iwamoto H

Hoya Healthcare Corp.

Disclosed are pyrazolone compounds, which have excellent copolymerisability and undergo no elution in an organic solvent when used for an ophthalmic plastic lens. They have an excellent absorption peak in the visible light region and function as a reactive yellow dye.

EUROPEAN COMMUNITY; EUROPEAN UNION; JAPAN; WESTERN EUROPE-GENERAL

Accession no.795413

Item 120
Gummibereifung
75, No.12, Dec.1999, p.16
German
CAR PAINTS

Under the heading 'Flopping cars', the Die Welt newspaper reports on a high-tech method for producing colour-variable pigments. Surfaces coated with this appear in different colours depending on the angle you look at them from. This reversal of colour effect is called 'flopping.' The most important application of flopping colours will be car paints. You will know it when a violet car comes close, and if it drives past, it suddenly appears green. The question remains what the police will make of this changeable world of colour. This abstract contains all the information of the original article.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.795002

Item 121
High Performance Plastics
Sept.2000, p.10
MEASURING THE EFFECT ON SHRINKAGE OF NEW NON-HEAVY METAL PIGMENTS

This article reports on a study of the problems associated with organic alternatives to pigments containing heavy metals, such as shrinkage, warpage and, sometimes, poor product performance. The study was carried out by the UK National Physical Laboratory.

UK,NATIONAL PHYSICAL LABORATORY; SOLVAY; DSM
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.792046

Item 122
Macromolecular Materials and Engineering
Vol. 282, Oct. 2000, p.30-6
ROLE OF PIGMENTS IN THE STABILITY OF POLYETHYLENE SYSTEMS
Maatoug M A; Anna P; Bertalan G; Ravadits I; Marosi G; Csontos I; Marton A; Toth A
Budapest,University of Technology & Economics; Hungarian Academy of Sciences

The effect of rutile titanium dioxide and phthalocyanine pigments on the photostability of HDPE films was investigated using various techniques, including mechanical testing, gel content measurements and X-ray photoelectron spectroscopy. The influence of phthalocyanine pigment on thermal degradation of the films and the photostability of films containing surface treated phthalocyanine pigment were also evaluated. Comparisons are made of phthalocyanine pigment-containing PE with unpigmented PE having a low stabiliser content and with TiO2-containing PE having a lower stabiliser content. 17 refs.

EASTERN EUROPE; HUNGARY

Accession no.791600

Item 123
Antec 2000.Conference proceedings.
Orlando, Fl., 7th-11th May, 2000, paper 43
EFFECTS OF FEEDING MODE ON DISPERSIVE MIXING EFFICIENCY IN SINGLE-SCREW EXTRUSION
Elemans P H M; van Wunnik J M
DSM Research
(SPE)

It may be difficult to uniformly disperse powders, such as pigments, in polymers in granule form using a single screw extruder, as powder agglomerates are formed under the pressure developed in the solids conveying zone. Using a barrier screw, it is shown that under-feeding reduces the pressure, and hence the formation of agglomerates, so facilitating dispersion. Ultramarine blue pigment powder was successfully dispersed in poly(butylene terephthalate). 15 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; NETHERLANDS; WESTERN EUROPE

Accession no.791355

Item 124
Japan Chemical Week
41, No.2092, 5th Oct.2000, p.3
MERCK OPENS NEW EFFECT PIGMENTS PLANT IN JAPAN

Merck has opened a new aluminium oxide flake plant at its Onahama production site in Japan, it is briefly reported. Aluminium oxide flakes are the raw material for a new generation of effect pigments which will be produced at the plant. Xirallic pigments demonstrate a powerful glitter effect with a distinctive shimmer property. During last year, customers in Japan demonstrated their strong interest in using Xirallic in high performance coatings for cars.

MERCK KGAA
JAPAN

Accession no.791112

Item 125
Modern Plastics International
30, No.9, Sept.2000, p.55

SPECIAL EFFECTS PACKAGES RAISE MARKET IMPACT FOR END-USERS
Leaversuch R D

Producers of pigments and colour masterbatches are developing novel ways to add flair to colour, increase functionality in parts and reduce the costs of special effects. BASF's Coatings & Colorants Division has commercialised three products based on the parent company's Variocrom colour-shift pigment. LNP Engineering Plastics has launched a line of thermochromatic compounds, in which pigments that change in response to shifts in temperature are dispersed. Engelhard has developed a line of mica-based pigments which, for the first time, create true two-quadrant colour travel in the pearlescent class.

USA

Accession no.789162

Item 126
Modern Plastics International
30, No.9, Sept.2000, p.42
ECKART EXPANDS IN PEARLESCENTS, SLATES A US PLASTICS LAB
Toensmeier P A

Eckart America has introduced its new Phoenix line of pearlescent pigments, an extension of the company's Flonac pearlescent line. The Phoenix line includes interference colour grades that seem to change colour when viewed from different angles. The company is also offering the Mastercolor line of gold, blue and green pigments, each with similarly coloured aluminium flake. Eckart America plans to open by Q4 a plastics technical lab at its new US manufacturing site in Louisville.

ECKART AMERICA LP
USA

Accession no.789160

Item 127
Asian Plastics News
July/Aug.2000, p.20
HOLOGRAPHIC EFFECT PIGMENTS FOR PLASTICS

Eckart has introduced a new range of holographic pigments for the plastics industry, it is reported in this little article. Brief details of these pigments (also known as "geometric pigments") are provided. In addition, other pigments products from the company are also mentioned.

ECKART; SPECTRATEK TECHNOLOGIES
EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; UK; USA; WESTERN EUROPE

Accession no.787907

Item 128
Asian Plastics News
July/Aug.2000, p.19
LIGHT FANTASTIC
Lee M

It is explained that iridescent pigments, originally developed for paints, are now making their way onto the plastics market. This article examines the situation, and highlights new specialty pigments from BASF ("Varicrom" pigments), Merck ("Colorstream"), Engelhard ("Sante Fe" colours) and GE Plastics (colour-shifting Lexan polycarbonate).

GE PLASTICS; BASF; MERCK; ENGELHARD
ASIA

Accession no.787906

Item 129
European Plastics News
27, No.8, Sept.2000, p.72
SOLUBLE COLOURS AIMED AT ETPS

Ciba Oracet is a novel range of polymer-soluble colourants for use in styrenics and other engineering plastics, it is briefly reported. The company claims these highly transparent pigments have excellent processing behaviour and good fastness properties. Ciba Oracet Orange LGP is the first product available that is made using the new isoxindigo chemistry specially developed by Ciba for the engineering plastics market.

CIBA
EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.785262

Item 130
European Plastics News
27, No.8, Sept.2000, p.72
COLOUR-FLOP SPECIAL EFFECTS

It is briefly reported that Nordmann Rassmann, a distributor of speciality additives, is now offering new interference pigments based on liquid crystal-modified organosilicone molecules from Wacker-Chemie. The Helicone HC pigments cause a colour-flop effect to be seen in the finished product that causes the colour to change with the angle at which the product is viewed. The pigments are available as a heavy metal-free polymer masterbatch that is easily dispersible in a variety of plastics.

NORDMANN RASSMANN GMBH & CO.; WACKER CHEMIE GMBH
EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.785261

Item 131
Patent Number: US 5997628 A 19991207
HEAT STABLE LAKED MONOAZO PIGMENT COMPOSITIONS
Bindra A P

Engelhard Corp.

Disclosed are red shade yellow compositions characterised by given formula. Also disclosed is a process for preparing red shade yellow pigment compositions prepared by initially a diazonium component comprised of one or more aromatic amines wherein at least one of said amines is a 1-sulpho-2-naphthylamine; and thereafter coupling the diazonium component with a coupling component comprised of a pyrazolone coupler to form a dye, and metallising said dye with at least one divalent metal.

USA

Accession no.783836

Item 132
Focus on Plastics Additives
No.28, July 2000, p.5
Q IS FOR QUINACRIDONE PIGMENTS

Quinacridones are organic, aromatic substances containing nitrogen atoms in some of their rings, and they are capable of imparting red, violet or golden colours. One violet pigment in this group is C.I. Pigment Violet 19. It can be used for shading whites. It can be reddish or violet and the particle size can be adjusted to give different shades. The desirable properties of quinacridones include stability during processing and at high service temperatures, together with resistance to discolouration through weathering or under the influence of light. These pigments also show good resistance to migration when in contact with liquid chemicals, with a few exceptions.

USA

Accession no.782561

Item 133
Polymers Paint Colour Journal
190, No.4429, June 2000, p.12-3
GLASS FLAKE EPOXY COMES OF AGE
Cross D P
Tikkurila Coatings

Glass flake epoxy pigments play a major role in protecting structural steelwork against corrosion. It is not surprising that since the demise of pigments that raised health and safety concerns, such as lead and zinc chromate, the glass flake has come out on top. It is colourless, allowing manufacturers to produce any colour of coating, is easy to manufacture and apply, and offers excellent mechanical and abrasion resistance because of its high hardness.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.778104

Item 134
Polymer Science Series A
42, No.1, Jan.2000, p.43-9
CHOLESTERIC COPOLYMERS WITH SPIROPYRANE SIDE GROUPS: EFFECT OF THE DYE STRUCTURE ON PHOTO- AND THERMOCHROMIC PROPERTIES
Bobrovsky A Y; Boiko N I; Shibaev V P
Moscow,State University

Two new photochromic spiropyrane acrylic monomers differing by the length of a flexible methylene spacer and the number of benzene rings are synthesised. Copolymerisation of these monomers with nematogenic and chiral monomers yields two series of ternary cholesteric copolymers with a variable content of spiropyrane photosensitive side units. These copolymers exhibit a selective light reflection in the visible spectral region. Under the action of UV radiation, the copolymer films with planar orientation form a merocyanine form of the dye whose absorption maximum coincides with the maximum of selective light reflection. The kinetic laws of the photooptical behaviour of copolymers at various temperatures are studied. The effect of the structure of photosensitive side units on the kinetics of transition from the spiropyrane form to the merocyanine one and vice versa is investigated. 18 refs.

RUSSIA

Accession no.776704

Item 135
Plastics News International
June 2000, p.24-5
CLARIANT SHOWCASES VAST NEW PRODUCT RANGE

New polymer additives, flame retardants, waxes and pigments from Clariant's Pigments and Additives division are described. The products were recently launched at the Scanplast and Plast 2000 exhibitions. Products include UV stabilisers, multifunctional additives for polyamides, PP and PE waxes, non-halogenated flame retardants, and yellow, red, violet and green pigments.

CLARIANT,PIGMENTS & ADDITIVES DIV.
USA

Accession no.776562

Item 136
Advances in Plastics Technology. Conference proceedings.
Katowice, Poland, 16th-18th Nov.1999, paper 5
NEW ON THE IRIODIN PEARL LUSTRE PIGMENT MERCK RANGE FOR USE IN VARIOUS PLASTICS MATERIALS
Gurges R
Merck KGaA
(Poland,Institute of Plastics & Paint Industry)

Details are given of Merck's new Iriodin lustrous pearlescent pigment range, for use in a number of plastics.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.775952

Item 137
(Tarrytown, N.Y.), 1999, pp.24. 27 cms. 13/6/00
BREAKTHROUGH IN VALUE. CIBA CROMOPHTAL 2000 SERIES
Ciba Specialty Chemicals Inc.

The Chromophtal 2000 series is launched with two new red pigments described here. Chromophtal Red 2020 and 2030 span the mid-red to bluish red segment. Their performance in polyolefins, PVC and polystyrene is described.

USA

Accession no.775922

Item 138
Injection Molding
8, No.5, May 2000, p.152
HUES CHANGE WITH PEARLY EFFECTS

This article looks at a set of pearl colours from Teknor Color. The pearlescent colours are designed for use with homopolymer polypropylene, clarified polypropylene, polyethylene, transparent polystyrene and flexible PVC. Their colour changes when viewed from different angles due to a titanium dioxide coating of fine mica particles. Targeted applications are toys, housewares, office accessories and packaging and colours available are red, gold, blue, green, orange and violet but are not recommended for food contact. This abstract includes all the information contained in the original article.

TEKNOR COLOR CO.
Accession no.773381

Item 139
Plastics Network
No.8, 2000, p.28-31
HOW TO GET THE MOST OUT OF PEARLESCENT PIGMENTS
Dyer K
Engelhard Corp.

This article gives an insight into how pearlescent pigments work in plastics, giving details on where they can be used, mixing colours, compounding do's and don'ts and tips for moulding and extrusion.

PHILLIPS CHEMICAL CO.
USA

Accession no.773367

Item 140
European Coatings Journal
May 2000, p.52/9
TENDENCY TO BLEEDING FOR ORGANIC PIGMENTS
Wang D; Schauer T; Entenmann M
Huainan Mining Institute; Stuttgart,Forschungsinstitut fur Pigmente und Lacke

This paper is first in a series in which recent work is presented on the evaluation of the pigment tendency to bleeding in waterborne coatings. Copper phthalocyanine pigments were used in an acrylic water-based binder system. It was found that the surface state of both the testing coating and the white top one affects greatly the bleeding tendency of the pigments. It was also demonstrated that the bleeding effect can be accelerated if the white top coating of the test specimen is suitably mechanically or chemically treated and aged under elevated temperatures. On the basis of colour measurements, new parameters were introduced for the quantitative assessment of the bleeding effect.

CHINA; EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.773022

Item 141
Canadian Plastics
58, No.3, March 2000, p.38
COLORED COMPOUNDS GLOW IN THE DARK

This short article informs us that RTP Co. of the USA has created a series of innovative glow-in-the-dark phosphorescent pre-coloured compounds. The pigments can be compounded with elastomers, acrylics, polycarbonate, ABS and PP, and offer a wide range of colours.

RTP CO.
USA

Accession no.772922

Item 142
Modern Plastics International
30, No.4, April 2000, p.77
GE'S BROAD SPECIAL-EFFECT TECHNOLOGY RAISES AESTHETICS OF ENGINEERING RESINS

The Visualfx offering from GE Plastics taps into a range of technology platforms, including metal flake, stone, light diffusion and colour-shift effect pigments. The special effect engineering thermoplastics are a light-diffusing Lexan polycarbonate, Cycloloy Magix polycarbonate/ABS blends containing a metallic-flake pigment and Lexan Intrigue with light-interference flake. Further effects available in polycarbonate and polycarbonate/ABS include speckle and marble, frost and ice surfaces and a glow-like, intense effect that offers unusually bright colour.

GE PLASTICS BV
EUROPEAN COMMUNITY; EUROPEAN UNION; NETHERLANDS; WESTERN EUROPE

Accession no.772702

Item 143
Modern Plastics International
30, No.4, April 2000, p.26-8
ADVANCES IN PIGMENTS AND PUR LEAD BAYER'S LINEUP FOR NPE

Toensmeier P A

Bayer is gearing up for NPE with an array of new products, technologies and applications. These include: Bayplast organic microgranular pigments with high flow, good dispersibility and low dusting; natural fibre-based structural composite prepregs, called NafpurTec, that replace GRP in auto applications; BaseLine high-pressure PU metering units; continuing development of weatherable ABS coextrusions for transportation markets such as trailers; and in-mould decorating advances.

BAYER CORP.
USA

Accession no.772691

Item 144
Italian Technology
No.1, May 2000, p.102
MASTERBATCH FOR THERMOPLASTIC

Vibagroup has introduced Vibatan PE/F White 2101 which is formulated with titanium dioxide and is particularly recommended for the manufacture of products for outdoor applications. Vibatan PE/F White/ UV 12137, formulated with an ultrafine titanium dioxide, is UV reflective. Vibatan PE Black 99463 is for the production of thin LDPE/LLDPE film and is particularly designed for mulching film. Vibatan Bopp masterbatches, biaxially oriented PP, are aimed at packaging and other special applications such as paper replacement.

VIBAGROUP
EUROPEAN COMMUNITY; EUROPEAN UNION; ITALY; WESTERN EUROPE

Accession no.772664

Item 145
Kunststoffe Plast Europe
90, No.3, March 2000, p.29-31
English; German
RIGHT MIX
Muller A
Finke K.,GmbH & Co.KG

In the field of colour matching, formulators will invariably be confronted with a number of customer-specific requirements that need to be taken into account. Consequently, this will frequently lead to some form of dialogue with the customer because it may well happen that individual aspects are 'mutually exclusive', so that the customer's brief cannot be realised in its entirety. Typical examples are employed to explain the problems involved. 8 refs. Translated form Kunstoffe Vol.90 No.3, 2000, p.110-2.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.771749

Item 146
Kunststoffe Plast Europe
90, No.3, March 2000, p.27-9
English; German
SUCCESS THROUGH COLOUR
Dumoulin L; Lapresa G
Radiant-Color-Dayglo; Ciba Specialty Chemicals Corp.

Alongside geometric shapes, colour effects are another particularly successful means of attracting attention. The fluorescence effect comes in a category of its own as far as its impact on people's colour perception is concerned. 3 refs. Translated form Kunstoffe Vol.90 No.3, 2000, p.106-8.

BELGIUM; EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.771748

Item 147
British Plastics and Rubber
April 2000, p.44
EXTENDED RANGE OF POLYMER ADDITIVES FROM CLARIANT

Brief product descriptions are given for a range of new polymer additives from Clariant. They include light stabilisers, waxes, pigments and flame retardants. Applications and characteristics are described for each new product type and grade.

CLARIANT
Accession no.771107

Item 148
High Performance Plastics
April 2000, p.2
"GLOW-IN-DARK" COMPOUNDS GIVE NEW SCOPE TO DESIGNERS

This short article draws our attention to new glow-in-the-dark phosphorescent pigments from RTP Co. of the USA. The pigments can be compounded with elastomers, acrylics, polycarbonate, ABS and PP, and offer a wide range of pastel colours.

RTP CO.
USA

Accession no.770998

Item 149
Plastics Additives & Compounding
2, No.4, April 2000, p.10
HIGH VALUE PINK PIGMENT FOR PLASTICS INTRODUCED BY CIBA

It is briefly reported that Ciba Specialty Chemicals has launched Cromophtal Pink PT, a strong blue-shade pink pigment that exhibits high colour strength, good fastness properties and dispersibility. The product is recommended for use in flexible and rigid PVC, polyolefins, styrenics, rubber and most engineering plastics.

CIBA SPECIALTY CHEMICALS
SWITZERLAND; WESTERN EUROPE

Accession no.768457

Item 150
Polymers Paint Colour Journal
190, No.4426, March 2000, p.11/6
CONCERNS OVER TOXICOLOGY DEMAND THE REMOVAL OF HEAVY METALS OUTSIDE THE EU AND USA
Meier M A; Gee P
Ciba Specialty Chemicals Inc.

Technological concerns about lead and lead compounds have given rise to an increasing trend towards replacement of lead in industrial paint systems. The US and European Union already have detailed legislation and regulations, whilst other countries are in the process of implementing restrictions. Pigment manufacturers as well as paint companies are being forced to seek alternatives to lead pigments in both the yellow and orange colour areas. The current status of legislation is reviewed, and recommendations are given for lead replacement with reference to the range of colour pigments from Ciba Specialty Chemicals Inc.

EU; EUROPEAN COMMUNITY; EUROPEAN UNION; USA; WESTERN EUROPE-GENERAL

Accession no.768082

Item 151
Iselin, N.J., 1999, pp.2. 28 cms. 4/3/00
MEARLIN FIREMIST PIGMENTS CREATE DIFFERENT SPECIAL EFFECT PIGMENTS
Engelhard Corp.

Applications and properties are described for Mearlin Firemist patented titanium dioxide coated borosilicate-based pigments from Engelhard. They are special effect pigments which give designers and formulators a spectrum of advanced optical effects to work with. Their smooth surface and large particle size create a brilliant, star-like glitter, and blends of Firemist pigment grades are claimed to produce true multicolour effects.

USA

Accession no.764785

Item 152
Additives for Polymers
April 2000, p.2
GLOW-IN-DARK COMPOUNDS FOR ENGINEERING RESINS

It is briefly reported that RTP has introduced a series of innovative "glow-in-the-dark" coloured compounds. They employ what is claimed to be a unique combination of phosphorescent pigments that can be compounded with elastomers, acrylics, polycarbonate, ABS and PP. One of the range, a green/yellow, is claimed to have a glow life that is ten times the current industry standard.

RTP CO.
USA

Accession no.764639

Item 153
Color and Appearance Retec 1999. Conference proceedings.
Nashville, Tn., 27th-29th Sept.1999, p.188-92
EFFECTS OF ENVIRONMENTAL AND HEALTH ISSUES IN PIGMENT CHOICE
Zamoyski A
Clariant GmbH
(SPE,Color & Appearance Div.)

The environmental and health trends observed in organic and inorganic pigments over the last few decades are discussed, with emphasis on PBT (persistent bioaccumulative toxicity).

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.764248

Item 154
Color and Appearance Retec 1999. Conference proceedings.
Nashville, Tn., 27th-29th Sept.1999, p.170-5
COLOURING OUTSIDE THE LINES
Houts E
Montell USA Inc.
(SPE,Color & Appearance Div.)

The colour matchers of the future must be fully trained, and not by just showing them how to match colour. They must understand that there is more than one way to match a colour, and they must be prepared to experiment when necessary to match these colours. In addition, there must be more innovation in designing the colours for the future. The manufacturers of metallic and special effects colourants are developing new products for use in plastics. New ways must be found to utilise these new products, and colour matchers must evolve to being colour developers as well.

USA

Accession no.764246

Item 155
Color and Appearance Retec 1999. Conference proceedings.
Nashville, Tn., 27th-29th Sept.1999, p.87-108
NEW PEARLESCENT PIGMENTS USING INNOVATIVE SUBSTRATES
Teaney S; Pfaff G; Nitta K
EM Industries Inc.; Merck E.,KG; Merck Japan
(SPE,Color & Appearance Div.)

The new generation of pearlescent pigments, based on synthetic silica and alumina flakes coated with highly refractive metal oxides, expand the range of possibilities

for stylists and designers in different application fields. Silica and alumina flake pigments with their precisely defined and controlled properties, especially thickness of the flake and chemical purity, open the door to a new era of engineered control pigment colouristics. These capabilities can be exploited to provide a new interactive resource for innovation and imagination in areas such as automotive coatings, coloured plastics, printing inks, ceramic products and cosmetic formulations. 8 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; USA; WESTERN EUROPE

Accession no.764239

Item 156
Plastics Additives & Compounding
2, No.2, Feb.2000, p.34-7
HOW TO ADD COLOUR AND PERFORMANCE
Holmes M

The recent High Performance Pigments '99 conference held in Miami Beach brought together specialists from around the world to discuss colourants. This article focuses on some of the latest developments in the world of colourants for the plastics industry which were highlighted at that conference.

BRITISH COLOUR MAKERS ASSN.; RHODIA; BASF; FLEX PRODUCTS; MERCK; FERRO CORP.; SACHTLEBEN; CLARIANT; BAYER

EUROPE-GENERAL; EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; UK; USA; WESTERN EUROPE

Accession no.763385

Item 157
Plastics Additives & Compounding
2, No.2, Feb.2000, p.17
PRECOLOURED COMPOUNDS TO THE FORE

This article highlights a series of glow-in-the-dark pre-coloured compounds from RTP Co. made using phosphorescent pigments. The colours available and the many applications of these compounds are highlighted. Also brought to our attention is a range of pre-coloured compounds that display geometric metamorphism (the chameleon effect of colour changes when viewed from different angles).

RTP CO.

USA

Accession no.763380

Item 158
Journal of Coatings Technology
72, No.901, Feb.2000, p.91-100
STUDY OF THE EFFECT OF DIFFERENT IRON OXIDE PIGMENT GRADES ON PROPERTIES OF AN INDUSTRIAL LATEX COATING
Chicago,Society for Coatings Technology

The effect of pigment shape on the properties of an industrial latex coating was studied in detail. Two red iron oxide pigments with similar properties were studied - one rhombohedral (produced by precipitation) and the other spheroidal (produced by calcination). They were added in the same volume concentration to the coating formulations and several liquid, dry-film, wet film and free-film properties were determined. 17 refs.

USA

Accession no.763078

Item 159
Shawbury, Rapra Technology Ltd., 1999, pp.459. 921
TOXICITY AND SAFE HANDLING OF RUBBER CHEMICALS. BRMA CODE OF PRACTICE. FOURTH EDITION
British Rubber Manufacturers Assn.; Rapra Technology Ltd.

This reference book provides an essential guide to health and safety in the rubber processing industry. The British Rubber Manufacturers' Association and Rapra Technology Limited have combined forces to update the information on hundreds of different rubber chemicals. New data has been compiled from reputable manufacturers and suppliers, and from standard sources of health and safety data. The book includes an introduction to the regulations governing the labelling and use of chemicals, together with definitions of toxicity, carcinogenicity, mutagenicity and effects on reproduction. Specific hazard, risk and safety labels are explained. The issue of health surveillance in the industry is dealt with in detail. Many rubber chemicals are examined individually in the form of abbreviated safety data sheets. They are listed under categories of use: reinforcing agents and fillers, accelerators and retarders, vulcanising agents, antidegradants, organic peroxides, peptisers and processing aids, ester plasticisers, blowing agents, bonding agents, latex auxiliaries, pigments and miscellaneous. Each chemical has a data sheet including trade names, suppliers, physical data, fire hazards (including explosion risk), regulatory labelling, health hazards, emergency first aid and food contact listings (FDA and BgVV). New to this edition is the addition of CAS and EINECS numbers to aid identification of materials.

Accession no.762158

Item 160
Brookfield, Ct., 1999, pp.iii,196. $100.00
COLOR AND APPEARANCE RETEC 1999:COLOR MATCHING AND PRODUCTION CONTROL. PROCEEDINGS OF A REGIONAL TECHNICAL CONFERENCE HELD NASHVILLE, TN., 27TH-29TH SEPT. 1999
(SPE,Color & Appearance Div.)

Eighteen papers address aspects of colour and appearance in plastics. Topics focus on pigment dispersion and polymer catalysis using titanate and zirconate coupling

agents, migration performance of fluorescent whitening agents in LDPE, colour control and process similarities, theory and practice of polymer film pigmentation, and environmental and health issues in pigment choice.

Accession no.759181

Item 161
Addcon World '99. Conference proceedings.
Prague, 27th-19th Oct.1999, paper 18, pp.7
EFFECT OF PIGMENTS ON THE DIMENSIONAL STABILITY OF POLYOLEFIN MOULDINGS
Tomlins P E
UK,National Physical Laboratory
(RAPRA Technology Ltd.)

Moulding trials were performed to determine which processing conditions have the most influence on the dimensional stability of pigmented HDPE mouldings. Pigments were phthalocyanine blue and Yellow 62. Feedstocks were prepared from masterbatches of pigment in LLDPE. The influence of adding an additional pigment, yellow 93, on the crystallisation behaviour of HDPE was also assessed. The experimental design used three injection times, three melt temperatures, two moulding temperatures, two holding pressures and two holding times. Unpigmented virgin HDPE was used as the control. Phthalocyanine blue was found to be an effective nucleating agent for HDPE. The interpretation of the kinetics of melt crystallisation under isothermal conditions required a two stage model. The primary crystallisation process reached equilibrium at a lower overall level of crystallinity in HDPE that contained phthalocyanine blue than in unpigmented HDPE or HDPE that contained Yellow 62 or Yellow 93. Significant changes in shrinkage attributable to the presence of phthalocyanine blue cannot be controlled by alterations in the processing conditions. The difference in the ratio of shrinkage measured in a direction parallel to the flow to that measured perpendicular to it in a simple moulding is probably the driving force for out-of-plane warpage. 13 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.758476

Item 162
Plastics News International
Aug.1999, p.32
GOOD NEWS FOR CADMIUM PIGMENT USERS

It is announced in this short article that the European Commission has voted for no further restrictions on the marketing and utilisation of cadmium pigments to colour plastics, thereby halting the trend of recent years in reducing the number of applications in which these pigments are permitted. Brief details are provided.

EUROPEAN COMMISSION

EU; EUROPEAN COMMUNITY; EUROPEAN UNION; WESTERN EUROPE-GENERAL

Accession no.757202

Item 163
Addcon World '98. Conference proceedings.
London, 9th-10th Nov.1998, paper 13
INFLUENCE OF PIGMENTS ON THE DIMENSIONAL STABILITY OF MOULDED PLATES
Tomlins P E; Banyard J; Butler B; Lord G
UK,National Physical Laboratory
(Rapra Technology Ltd.)

Many of the vibrantly coloured inorganic pigments prized for their colour fastness and thermal stability contain heavy metals such as cadmium and are, or have been, phased out because of their environmental unacceptability. Some of the organic pigment replacements are renowned for causing problems of dimensional instability in mouldings, particularly those manufactured from polyolefins. The influence that pigments have on the in-plane shrinkage and warpage and out-of-plane distortion of a plate moulding manufactured from HDPE is assessed. Variables such as plate thickness and post-moulding treatment are considered as well as colour. 15 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.757025

Item 164
Retec '98. Riding the Wavelength of Color. Conference proceedings.
Cleveland, Oh., 27th-29th Sept.1998, paper 4
STABILISATION OF POLYPROPYLENE WITH YELLOW 93 AND YELLOW 110 USING SILICONE BASED HINDERED AMINE LIGHT STABILISERS
Lee R E; Kuvshinnikova O I; Schumm J
Great Lakes Chemical Corp.
(SPE,Color & Appearance Div.; SPE,Ohio Firelands Section)

Pigment-HALS (hindered amine light stabiliser) interactions impact the UV durability of many thermoplastic resins like PP. This is seen with both organic and inorganic pigments when retention of mechanical properties such as tensile strength and elongation can be either prolonged or shortened as compared to unpigmented articles. Because this shift in UV durability is not always an improvement, characterisation is necessary. From another point of view, these interactions also affect colour development and tint strength in systems as the light stabiliser packages are modified. The latter type of interaction can occur because of, or accelerated by, either heat or UV light. Two yellow pigments, Yellow 93 and Yellow 110, with traditional and silicone backbone hindered amine light stabiliser packages are investigated. The aim is to evaluate initial colours, colour changes and

shifts in UV durability as a function of pigment stabiliser interaction. This work is the continuation of research presented at the 1997 CAD RETEC.

USA

Accession no.755497

Item 165

Retec '98. Riding the Wavelength of Color. Conference proceedings.

Cleveland, Oh., 27th-29th Sept.1998, paper 2

BAD DAY OF COLOUR MATCHING IS OFTEN A GREAT DAY OF UNIQUE EFFECTS

Schoppe R J

Silberline Manufacturing Co.

(SPE,Color & Appearance Div.; SPE,Ohio Firelands Section)

The use of metallic flakes such as gold, copper, bronze and tin dates back several hundred years. In 1930, E.J. Hall developed the wet ball mill process as an economical way of making aluminium flake pigments. These pigments found uses in paints, as well as metal protective and roof coatings. They have been used in plastics for at least forty years and are used to provide opacity, make a plastic part look like metal, reflect heat/light, or add sparkle or glitter to a colour. Over this time, many people have successfully used them to gain desired effects. These successes have come after a great deal of trial and error. Emphasis is placed on the wide variety of problems that have been severe enough to warrant an explanation. The better the problem is described and its effects can be shown, the easier it is to help explain what has gone wrong. 4 refs.

USA

Accession no.755495

Item 166

Plastiques Modernes et Elastomeres

51, No.7, Oct.1999, p.6/11

French

SPECIAL EFFECTS: FROM PEARL EFFECTS TO MULTI-INTERFERENCE PIGMENTS

Renaudat E

A survey is made of developments by a number of companies in pigments and colourants for imparting special visual effects to plastics.

WORLD

Accession no.754654

Item 167

Plastiques Modernes et Elastomeres

51, No.7, Oct.1999, p.4-5

French

SPECIAL EFFECTS MAKE A DIFFERENCE

Renaudat E

The use of pigments in the form of masterbatches, powders, granules and liquid colourants to obtain special visual effects in plastics is discussed. The relative advantages of mineral and organic pigments in these applications are examined.

BASF AG; MERCK; ENGELHARD CORP.; MEARL CORP.; WILSON COLOR

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; USA; WESTERN EUROPE

Accession no.754653

Item 168

Plastverarbeiter

49, No.9, p.128

German

COLOURED HIGHLIGHTS

Clariant's Pigments and Additives division is expanding its product range by two new pigments for colouring plastics. PV-yellow H2GR VP 2293 is based on PV-yellow HGR and is approximately 25% more strongly coloured. It can be used in all sectors of plastic colouring. PV-violet ER VP 2223 has excellent dispersibility and can colour fibres and thin-walled items. It also has good heat resistance. This abstract contains all the information in the original article.

CLARIANT GMBH

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.754347

Item 169

Journal of Materials Chemistry

9, No.10, Oct.1999, p.2277-8

FIRST EXAMPLE OF THERMOCHROMISM OF DYES EMBEDDED IN TRANSPARENT POLYMER GEL NETWORKS

Seeboth A; Kriwanek J; Vetter R

WITEGA Applied Materials Research Co.Ltd.

The betaine dye 2,6-diphenyl-4-(2,4,6-triphenylpyridinio)phenolate(DTPP) and the indicator dye Congo Red were shown to exhibit very high thermochromism, if they were embedded in an aqueous PVAl-borax-surfactant gel network. In the case of DTPP at pH 8.5, the colour changed gradually from colourless at 10C to a deep violet at 80C. Similarly, for Cresol Red, a change from yellow to wine-red was observed. An explanation for the observed reversible colour changes in the closed hydrogel systems was given by a temp.-induced shift of the proton-transfer equilibrium between the phenolate and the phenol form of the dye molecules in the microenvironment of the gel network. These thermochromic gels could be of use in a wide range of applications, such as temp. sensors, large-area displays and smart or intelligent windows. 15 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.754078

Item 170
Focus on Plastics Additives
No.20, 1999, p.5
WOOD, GRANITE, PLASTICS... THEY ARE ALL THE SAME ON THE SURFACE

Recent developments in pigments to provide natural-effect surface finishes from Ferro, M.A. Hanna, Hampton Colours, Douglas Baker and Eckhart America are outlined. 10 refs.

FERRO CORP.; HANNA M.A.,CO.; HAMPTON COLOURS LTD.; BAKER D.,PLASTICS LTD.; EKHART AMERICA LP
USA

Accession no.753201

Item 171
Asian Plastics News
Oct.1999, p.21
PEARLESCENT PIGMENTS WITH GREATER SPARKLING EFFECTS

Brief product details are given of a new pigments from the Specialty Pigments & Additives Group of Engelhard. They include pearlescent pigments, kaolin-based products and inorganic colour pigments.

ENGELHARD CORP.
USA

Accession no.753005

Item 172
Asian Plastics News
Oct.1999, p.21
LUMILUX PIGMENTS FOR ESCAPE ROUTE SYSTEMS

Lumilux Green N-pigments are being introduced to Asia for use in escape route systems, by AlliedSignal Specialty Chemicals. The use of afterglow pigmented plastic sheets for emergency signs is considered new in Asia, and has the potential to be a major market for this application, according to the company. Brief details are given of Lumilux N afterglow pigments, which possess the property of emitting light while they are being excited with natural or artificial light. Based on the photoluminescent principle, the effect can be perceived several hours after the source of excitation has been removed.

ALLIEDSIGNAL SPECIALITY CHEMICALS
ASIA

Accession no.753004

Item 173
Modern Plastics International
29, No.11, Nov.1999, p.26-7
INNOVATIVE COLOUR-SHIFT TECHNOLOGY CARVES OUT ROLE IN PLASTICS DESIGN
Leaversuch R D

A completely new class of special-effect pigments is emerging in the US and Europe. Known generically as "optically variable" pigments, they are able to "travel" or "flop" from one hue to another over a wide colour range in response to shifts in the angle of light. In recent months, Flex Products, BASF, Merck Darmstadt and EM Industries have begun to offer colour-interference pigments to leading global masterbatch houses who, in turn, are active with their customers in development work with the materials.

USA; WESTERN EUROPE-GENERAL

Accession no.752650

Item 174
Chemical Week
161, No.39, 20th Oct.1999, p.44-5
PIGMENT PROSPECTS FADE AMID FIERCE COMPETITION
Hume C

The last few years have been tough for pigment producers, and the future will be even harder, according to SRI Consulting. Globalisation has brought US and European makers into direct competition with cut-price producers in India and China. Producers in the West would like to think that better, safer pigments will win the battle, but the deciding factor is price. Pigment production in China has soared in recent years, and although commodity inorganic pigments still constitute the majority of Asia's production, the amount of higher-value organic pigments is increasing. US imports of the organic pigment phthalocyan Blue 15:3 doubled, to 2,500 m.t. between 1995 and 1998, says SRI Consulting; 42% of the imports came from China. US imports of the quinacridone Violet 19 tripled in the same period, to 482 m.t. US imports from China, non-existent in 1995, shot to 62% of total 1998 imports. Details are given.

SRI CONSULTING
USA; WORLD

Accession no.752363

Item 175
Additives for Polymers
Nov.1999, p.2
MAKING PLASTICS LOOK LIKE NATURAL MATERIALS

According to Wilson Color, the business unit of M A Hanna Co., customers are looking for products with a more 'natural' look using white stone and earthenware effects created for indoor and outdoor products, as well as wood-effect chairs and tables which the company has developed in partnership with Grosfillex. The trend is to replace traditional materials with plastics and to use the plastic to imitate the original or highlight certain aspects of it, it is claimed. Building on its experience with fibres, beads, pearlescent and fluorescent effects, Wilson is reported to be responding to this challenge with a range

of natural effects. This abstract includes all the information contained in the original article.

WILSON COLOR
BELGIUM; EUROPEAN COMMUNITY; EUROPEAN UNION; WESTERN EUROPE

Accession no.751848

Item 176
Paint & Ink International
12, No.4, July/Aug.1999, p.18/21
PIGMENTS GUIDE: MORE THAN MERE COLOURED POWDERS
Padley M; Schofield L
European Colour

An overview is given of the basic synthesis of both azo and dyecomplex pigments, and details are given of some of the controlling elements available to the pigment designing chemist. Topics covered include pigment design and diazotisation, coupling techniques, dyecomplex pigment synthesis, and choice of complexing agent, and optimisation of pigment properties, including the influence of parameters such as pH, temperature, concentration, addition rate, duration and rate of agitation, surface treatment and pigment finishing.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.750727

Item 177
Paint & Ink International
12, No.4, July/Aug.1999, p.12/6
HIGH VALUE STANDARD FOR FUTURE COATINGS

Diketopyrrolopyrrol chemistry has traditionally been regarded as suitable only for colourants in high performance applications such as automotive paints and coil coatings. Ciba Specialty Chemicals, however, has developed a novel pigment based on DPP chemistry, called Irgazin Red 2030, which is claimed to set a new standard for the industrial coatings market. It is a clean, highly saturated mid-shade red, characterised by high durability, chemical resistance, opacity, tinctorial strength, saturation and heat resistance. In addition, the product offers value in the liquid industrial and decorative, and the powder coating markets.

CIBA SPECIALTY CHEMICALS
USA

Accession no.750726

Item 178
Modern Plastics International
29, No.10, Oct.1999, p.86-9
PRODUCT GALLERY

Advances in colourant technology are outlined. Neolor rare earth pigments from Rhodia are compatible with all polymers and are heat stable up to 350C. M.A. Hanna is offering proprietary colourant formulations combined with laser technology which provide non-charring, low-energy, fast-marking capabilities for a wide range of resins. Holcobatch from Holland Colours is a non-dusting prilled pigment dispersion designed for colouring PETP bottles, film and sheet.

WORLD

Accession no.749345

Item 179
Modern Plastics International
29, No.10, Oct.1999, p.85
COLOURANT PRODUCERS KEEP PACE WITH GLOBAL DEMANDS
Defosse M T

It is claimed the speed of change, both in technology and in business consolidation, has reached an unprecedented level in the colourant and masterbatch industries. Turnaround times have shrunk considerably. Among key trends, processors are seeing the use of a higher percentage of pigment in masterbatches and colour concentrates, facilitating the use of less colourant for equal or superior effect. For example, pigment loadings of 50-75% in Ultracolor concentrates from Teknor Color, allow letdown ratios of 1% or less.

USA; WESTERN EUROPE

Accession no.749344

Item 180
European Plastics News
26, No.9, Oct.1999, p.58
SPECIAL EFFECTS FROM CLARIANT

It is briefly reported that Clariant Masterbatches has launched a new range of special effect masterbatches for the packaging industry. They include granite, metallic, pearlescent and interference special effects. These new masterbatches have been created for extrusion, injection and blow moulding applications. They are ideal for use in PE, PP, PS, PVC, ABS and SAN resins.

CLARIANT MASTERBATCHES
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.749197

Item 181
1998 Polymers, Laminations and Coatings Conference. Book 1. Conference proceedings.
San Francisco, Ca., 30th Aug.-3rd Sept.1998, p.565-71
COLOURANTS FOR POLYMER APPLICATIONS: PRACTICAL OVERVIEW
Fay J J
Ciba Specialty Chemicals Corp.
(TAPPI)

There is a wide variety or colourants that may be used in polymer applications. There are polymer soluble dyes,

organic pigments, inorganic pigments and even heavy metal containing pigments. Within each of these broad classifications, there is a variety of chemistries that form the basis of the colorants that are commercially important to the polymer industry. These chemistries range from the relatively simple inorganic iron oxides to the more complex heterocyclic organic pigments. Fortunately, there are systematic means for identifying colorant types which help identify specific pigments. Knowledge of the fundamental chemical classes is useful to those who need to know the materials that are available or are commonly used for colouring polymers, and additionally, the general attributes of these materials.

USA

Accession no.748325

Item 182
British Plastics and Rubber
July/Aug.1999, p.43
CADMIUM PIGMENTS OK AFTER ALL?

Following a cradle-to-grave life cycle risk assessment carried out by an independent consultant on behalf of the European Commission, the International Cadmium Association reports that there should be no further restrictions on the marketing and use of cadmium pigments. The assessment concluded that the emissions from the cadmium life cycle do not pose any significant threat to the environment. Brief details are given of the findings.

INTERNATIONAL CADMIUM ASSOCIATION; EUROPEAN COMMISSION
EU; EUROPEAN COMMUNITY; EUROPEAN UNION; WESTERN EUROPE-GENERAL

Accession no.747543

Item 183
Kunststoffe Plast Europe
89, No.7, July 1999, p.37-8
COLOR VARIABLE PIGMENTS
Goetze W; Schmid R
BASF AG

BASF's Variocrom Color Variable Pigments are discussed with particular reference to colour based on the interference phenomenon, structure of Color Variable Pigments, potential colour shades, pigmentation of plastics, processing, combinations with classical colour pigments, sample applications, and licensing and toxicology. (German version of this paper, which includes graphs and tables, is on p.110-2)

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.747383

Item 184
European Plastics News
26, No.8, Sept.1999, p.74
CIBA ADDS GREEN DYE FOR CD-RS

Irgaphor Supergreen OS from Ciba is a novel dye for recordable compact discs, it is briefly reported. The benefits of CD-Rs produced with the new dye include high stability to light, even in harsh environments, and a suitability for both gold and silver reflectors. The phthalocyanine dye, which is used as a single component powder, is claimed to have virtually unlimited shelf life.

CIBA
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.745271

Item 185
Shawbury, Rapra Technology Ltd., 1999, pp.238. 52
METALLIC PIGMENTS IN POLYMERS
Wheeler I

The purpose of this book is to bridge the technology gap that has developed over the last 20 years by providing a comprehensive account of the nature, manufacture, formulation and applications of the diverse metallic pigments commercially available today. Whilst the text concentrates on direct pigmentation of polymers there are also two chapters on metal pigment coatings for polymer substrates. In addition to the familiar colouristic applications there is a chapter on the many, often novel, functional applications in which colour is either accidental or irrelevant.

Accession no.743913

Item 186
Plastics and Rubber Weekly
No.1800, 20th Aug.1999, p.11
STILL SHINING AT SILBERLINE

Brief details are given of a range of new products in the Silberline portfolio of pigments. These include Silcroma high temperature stable and shear resistant coloured metallic flake pigments, Silvet LR laser receptive pigments, and SilBer Tones styling pigments for dark polymers used in packaging, telectronics, personal care items and sports goods.

SILBERLINE LTD.
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.743350

Item 187
Journal of Vinyl and Additive Technology
5, No.2, June 1999, p.76-80
PHENOMENON OF COLOR CHANGE IN COLORED POLY(VINYL CHLORIDE) COMPOUND
Kann Y
Lynn Plastics Corp.

The phenomenon of colour shift was investigated during the development of a coloured PVC compound for

exterior automotive application containing, among other pigments, red anthraquinone (C.I. Pigment Red 177) and titanium dioxide. Colour was found to shift about 2 points delta b(starred) on a CIELAB scale from yellow to blue during the first one and a half months after the compound had been processed. The shift took place under regular conditions, i.e. room temp. with no exposure to sunlight or heat. 2 refs.

USA

Accession no.743281

Item 188
Focus on Plastics Additives
No.12, 1999, p.8
C IS FOR COLOUR INDEX

The Society of Dyers and Colorists published the world's first Colour Index in 1924 listing a large number of dyes and pigments. The substances were classified by their structure, name and a constitution number. Essentially the same system exists today, but more information is included in the index, including solubility parameters, heat and light stability and chemical resistance. A new Pigments and Solvent Dyes edition has now been produced. 2 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.742825

Item 189
Pitture e Vernici
75, Nos.12-3, 1st July/31st Aug.1999, p.39-41
Italian; English
HEAVY METAL PIGMENTS REPLACEMENT IN POLYOLEFINS COLORATION
Ansias M P
Ampacet

The need to eliminate heavy metals from pigments used in polyolefin colouration is discussed, with respect to Ampacet's reformulation activities and the consequences on the cost of such products. Details are given of yellow and orange replacement pigments in LDPE and HDPE films, and in injection moulding and blow moulding applications.

EUROPEAN COMMUNITY; EUROPEAN UNION; ITALY; WESTERN EUROPE

Accession no.740739

Item 190
Revista de Plasticos Modernos
76, No.510, Dec.1998, p.692-3
Spanish
ULTRAMARINE BLUE: AN OLD PIGMENT, A NEW PROCESS
Achon M A

Applications of ultramarine blue as a pigment for plastics are examined, and the advantages of a continuous process developed by Prayon of Belgium for its manufacture are described. Details are given of the Company's production capacity for this pigment.

PRAYON PIGMENTS SA; ZEUS QUIMICA
BELGIUM; EUROPEAN COMMUNITY; EUROPEAN UNION; SPAIN; WESTERN EUROPE

Accession no.740576

Item 191
Plastics Additives & Compounding
1, No.2, June 1999, p.10
NEW PIGMENTS FROM CLARIANT

Brief descriptions are given of new pigment products from Clariant. PV Fast Yellow H2GR VP 2293 is for use in a wide range of thermoplastics, Graphtol Yellow H2R VP is recommended for film and fibre applications, PV Fast Pink E, is a new generation of quinacridone pigments, and PV Fast Violet ER VP 2223, is recommended as a replacement for the indigo pigments in PVC applications.

CLARIANT

Accession no.739907

Item 192
Plastics Additives & Compounding
1, No.2, June 1999, p.8
SPECIAL EFFECT PIGMENT OFFERS MULTICOLOURED EFFECTS

Firemist special effect pigments from Engelhard Corp. are part of the Mearlin pigment line. The material is a new line of titanium dioxide-coated glass pigments, that can add multi-coloured effects in blends, strong depth effects, and a star-like effect to plastics. They are anticipated to enhance the visual impact of skis, surf boards, in-line skates and toys, offering good chroma, colour purity, brightness, transparency and reflectivity. They are available in six colours, details and features of which are given.

ENGELHARD CORP.
USA

Accession no.739904

Item 193
Journal of Coatings Technology
71, No.892, May 1999, p.101
YELLOW IRON OXIDE

Elementis Pigments has introduced YV-1188, a high-performance yellow iron oxide. The pigment is reported to provide a lighter yellow that reduces viscosity compared with standard-grade yellow iron oxides. Applications include paints, plastics, rubber and paper. This abstract includes all the information contained in the original article.

ELEMENTIS PIGMENTS
USA

Accession no.739269

Item 194
Modern Plastics International
29, No.7, July 1999, p.130
RARE-EARTH COLOURS

It is briefly reported that an alternative to cadmium, lead and organic colourants is offered in five rare earth pigments in shades ranging from dark red to light orange. A cerium oxide coating provides good dosing properties and high thermal stability. Neolor pigments are compatible with all polymers and are heat stable up to 350C.

RHODIA TERRES RARES SA
EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; WESTERN EUROPE

Accession no.737481

Item 195
Plastics Technology
45, No.6, June 1999, p.71-3
HOW TO GET THE MOST OUT OF PEARLESCENT PIGMENTS
Dyer D
Engelhard Corp.

A better understanding of how pearlescent pigments work in plastics can help compounders and processors get the effect they require and avoid common pitfalls, such as pigment separation and flow and weld lines.

USA

Accession no.735622

Item 196
Antec '99. Volume III. Conference proceedings.
New York City, 2nd-6th May 1999, p.2854-8. 012
BANNING HEAVY METAL PIGMENTS IN MINNESOTA - THE NEXT ICEBURG?
Golding T
Clariant Corp.
(SPE)

For several years the Minnesota Legislature, guided by the MPCA (Minnesota Pollution Control Agency), has been evolving a law to significantly reduce heavy metal pigment use in the state. The finalised law takes CONEG (Coalition of Northeastern Governor's) guidelines to a higher level. CONEG was intended to reduce the amount of heavy metals in the consumer waste stream by limiting their use in disposable packaging materials. The Minnesota law applies CONEG limits of lead, cadmium, mercury and hexavalent chromium to all pigments, including plastic colorants. The evolution of this law is reviewed. Its significance to the plastics industry if similar events occur in other states is discussed. 8 refs.

USA

Accession no.734255

Item 197
British Plastics and Rubber
May 1999, p.31
FULL CIRCLE
Hampton D
Hampton Colours Ltd.

Hampton Colours was recently asked to produce a Bakelite effect in ABS. A plunger injection moulding machine was found that produced a good imitation. The company has also been asked to make crystal PS imitate glass, with a slightly green edge.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.734224

Item 198
Polymers Paint Colour Journal
189, No.4416, May 1999, p.28/31
PRINCIPLE FEATURES OF TRADITIONAL AND MODERN METAL EFFECT PIGMENTS
Wissling P
Eckart-Werke

Metal flake effect pigments are discussed and the various types available are described and compared. The introduction, in particular, of coloured aluminium flakes is examined. It is argued that to understand traditional aluminium flakes and the resulting different optical properties, it is necessary to analyse the manufacturing process in detail. This article sets out to correlate the optical features with the physical properties defined through the production process.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.732368

Item 199
Polymers Paint Colour Journal
189, No.4416, May 1999, p.25
SCIENCE AND TECHNOLOGY OF EFFECT PIGMENTS

Developments in effect pigments, described as innovative ways of generating eye-catching effects, are reported to be growing. Particular details are given of products which use the layer-substrate interference principle, and their optical characteristics are compared with those pigments using absorption principles. Details are given of particular products and the use of new substrates.

EUROPE-GENERAL

Accession no.732367

Item 200
Coloring Technology for Plastics.
New York, N.Y., Plastics Design Library, 1999, p.263-9. 52
COLOURED ENGINEERING RESINS FOR HIGH STRAIN/THIN WALLED APPLICATIONS
Mulholland B M

Ticona Corp.
Edited by: Harris R M

As part designers push the limits of strain requirements on levers and snap-fits, or continue reduce size and cost by designing thinner and thinner sections, processors are often faced with breakage problems with coloured resins. The problem can be unexpected if the new part design is prototyped in natural, or the processor has been using the coloured resin in an existing sign without problems. Two main causes of breakage problems with engineering resins are discussed: colourant selection and dispersion. 1 ref.

USA

Accession no.732224

Item 201
Coloring Technology for Plastics.
New York, N.Y., Plastics Design Library, 1999, p.209-17. 52

MULTI-ANGLE SPECTROPHOTOMETERS FOR METALLIC, PEARLESCENT AND SPECIAL EFFECTS COLOURS

Teunis B D
X-Rite Inc.
Edited by: Harris R M

The matching and quality control of colour components has always been an ever-challenging task. With the introduction of higher quality standards and consciousness it has become even more critical to accurately measure and reproduce colour. Added to the quality issue has been the introduction of new special effects colours that change appearance with viewing angle. The use of the special effects along with metallic and pearlescent colours has generated a need for an instrumental means of quantifying these effects. This has been especially true in automotive exterior colours. Designers have used these special effects in new and innovative designs which has forced quality engineers to search for more consistent and accurate means of quantifying colour in the manufacturing process. When evaluating exterior automotive colour differences with instrumentation there are a number of variables that need to be considered; most important is instrument geometry. Other areas of focus are colour standards, paint technologies, part configuration, part orientation and visual comparison. While older existing instrument geometries can give some indication as to what kind of colour difference exist, they do not provide the correlation to visual assessment nor correlation to process parameters needed to make adjustments. Utilising recent technology, it is now possible to accurately monitor and control automotive colours with the use of a multi-angle spectrophotometer. 4 refs.

USA

Accession no.732218

Item 202
Coloring Technology for Plastics.
New York, N.Y., Plastics Design Library, 1999, p.171-4. 52

IMPROVING THE PROCESSABILITY OF FLUORESCENT PIGMENTS

Heyl D A
Day-Glo Color Corp.
Edited by: Harris R M

Fluorescent pigments for plastic applications have presented a variety of processing challenges in the plastics industry. One such problem encountered by the end-user is plateout. An attempt is made to define, determining the cause of, and minimise the impact of plateout associated with fluorescent pigments, in order to improve their processability. 4 refs.

USA

Accession no.732213

Item 203
Coloring Technology for Plastics.
New York, N.Y., Plastics Design Library, 1999, p.87-98. 52

SAFETY, HEALTH AND ENVIRONMENTAL REGULATORY AFFAIRS FOR COLOURANTS USED IN THE PLASTICS INDUSTRY

Smith H M
Sun Chemical Corp.
Edited by: Harris R M

The subject of safety, health and environmental affairs is today so volatile and capable of change that it is anticipated that some of the information included will be obsolete in the months following this publication. A 'snapshot' of the state of affairs existing at the time of writing is presented. With continued focus on dyes and pigments assured over the foreseeable future by state and federal agencies, it is certain that this area of endeavour will continue to merit close attention. 8 refs.

USA

Accession no.732203

Item 204
Coloring Technology for Plastics.
New York, N.Y., Plastics Design Library, 1999, p.49-53. 52

METALLIC LOOKING PLASTICS, WITH NEW SILVER AND COLOURED ALUMINIUM PIGMENTS

Bung H-H
Eckart America LP
Edited by: Harris R M

The application of aluminium pigments in plastics has presented a problem in the past because of the flow lines which they cause in injection moulded parts. By using large size aluminium pigments, with an average particle size of 60 to 330 mu and larger, it is possible to avoid these flow lines and produce metallic looking plastic parts.

This concept has been taken one step further by depositing colourants on these large size aluminium pigments, thereby creating a blue, green and golden metallic colourant that can be used in plastics without flow lines. These pigments offer exceptional styling effects by themselves, and in combination with other colourants, including bronze pigments. 1 ref.

USA

Accession no.732198

Item 205

Coloring Technology for Plastics.
New York, N.Y., Plastics Design Library, 1999, p.39-48. 52

COLOUR STYLING WITH GENUINE METALLICS IN PLASTICS

Bunge H
Obron Atlantic Corp.
Edited by: Harris R M

Aluminium and bronze pigments offer a wide range of unique colouristic effects, which are described in relation to their different optical characteristics. In the past, the chemical resistance of metallic pigments has always been a problem. During the last few years, various modified versions of both aluminium as well as bronze pigments have been developed which open new areas for their application in plastics. Their characteristics and advantages are discussed, together with how to best incorporate metallic pigments into the different plastic resins. 4 refs.

USA

Accession no.732197

Item 206

Coloring Technology for Plastics.
New York, N.Y., Plastics Design Library, 1999, p.35-8. 52

FLUORESCENT PIGMENTS AS PLASTIC COLOURANTS: AN OVERVIEW

Bianchi D D
Radiant Corp.
Edited by: Harris R M

Fluorescence is a process of photo-luminescence by which light of short wavelengths, either in the UV or the visible regions of the electromagnetic spectrum, is absorbed and radiated at longer wavelengths. The re-emission occurs within the visible region of the spectrum and consequently is manifested as colour. The commercial development and sale of fluorescent pigments and colourants dates back to the 1940s in the field of graphic arts. Development was initially centred around the application of point-of-purchase displays, advertising, safety and identification. To date, fluorescent materials have gained widespread acceptance in a myriad of applications, including toys, fashions and packaging. The unique brightness of a fluorescent may be employed alone when an attempt is made to set a product apart from the rest in a competitive situation. In addition, fluorescents can be used as an accent in contrast to a more drab colour, or they may be added to conventional pigments to brighten an otherwise dull colour. Due to the speciality of this market, only three domestic and four foreign manufacturers have enjoyed any real success in the manufacture of fluorescent colorants. 5 refs.

USA

Accession no.732196

Item 207

Coloring Technology for Plastics.
New York, N.Y., Plastics Design Library, 1999, p.21-33. 52

THREE COLOUR EFFECTS FROM INTERFERENCE PIGMENTS

Armanini L; Mattin H L
Mearl Corp.
Edited by: Harris R M

The optical properties of pearlescent and interference pigments are examined and compared to absorption colourants. The reflection from pearlescent and interference pigments is specular. The reflection from absorption pigments is scattered and diffuse. Because of this difference, interesting colour effects are observed when the two are mixed. When absorption colorants are directly precipitated on interference pigments, combination pigments are formed. Three distinct colours can be observed depending on the colourants and the angle of observation. At the specular angle the reflection colour from the interference pigment is observed. At the diffuse angle or angles away from the specular, the absorption colorant is seen. A third colour can be seen by transmission, which can be entirely different from the reflection colour or the absorption colour. The absorption colourant mixes with the transmission colour of the interference pigment to form a new third colour, an enhancement of the absorption colour or a neutralisation of colour depending on the colours and how they mix. 4 refs.

USA

Accession no.732195

Item 208

Coloring Technology for Plastics.
New York, N.Y., Plastics Design Library, 1999, p.13-9. 52

PHOTOCHROMIC DYES OF ENHANCED PERFORMANCE

Clarke D; Ellwood F; Robinson J
Keystone Aniline Corp.
Edited by: Harris R M

Photochromic compounds are those which can be reversibly transformed between two states having different absorption spectra, such change being induced in at least one direction by the action of electromagnetic

radiation. Photochromic compounds were first reported in 1807. Since then, a large number of inorganic and organic systems showing photochromic properties have been reported. Existing technology in this area includes some products already in the market place, such as the silver halide glass based Reactolite Rapides and some simpler organic photochromic dyes. The potential use for photochromism in marketable products is huge with applications in plastic lenses, imaging, agriculture, fashion, optical storage, advertising, military, security and novelties. Organic photochromics exhibit good colouration and, unlike silver halides, can be incorporated into plastics, widening the fields of possible use. The properties and synthesis of spiroindolinonaphthoxazines and chromenes, including some of the optical and performance properties, are reviewed.

USA

Accession no.732194

Item 209

European Coatings Journal

No.4, 1999, p.90/6

NEW EFFECT PIGMENTS USING INNOVATIVE SUBSTRATES

Teaney S; Pfaff G; Nitta K

EM Industries Inc.; Merck KgaA; Merck Japan Ltd.

Pigments based on the layer-substrate interference principle are the most important types of pearlescent pigments today. Most of them consist of metal oxide layers coated on mica, a sheet layer silicate mineral. However, mica pigment characteristics are limited to the thickness. Two new synthetic materials can be used in place of mica as substrates for effect pigments. New colouristic effects can be realised by suitable combination of silica flakes or alumina flakes as carrier and coating with relatively high index metal oxides such as titanium dioxide and iron oxide. 8 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; JAPAN; WESTERN EUROPE

Accession no.731741

Item 210

Sudbury, 1996, pp.23. 12 ins. 17/5/99.

SPECIALITY PIGMENTS AND DISPERSIONS FOR WOOD FINISHES

Cookson Matthey Ceramics & Materials Ltd.

Technical product data are presented for the range of speciality pigments and dispersions from Cookson Matthey for use in wood finishes. They are based on highly durable transparent iron oxides, and are complemented by a range of lightfast tinters and UV absorbers. Details are given of water based acrylic dispersions, VOC-free dispersions, tinter dispersions, solvent based dispersions, furniture stains, and UV absorbers. Suggested formulations are included.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.731523

Item 211

Pitture e Vernici

75, No.3, 15th-28th Feb.1999, p.11-7

Italian

NEW PEARLESCENT PIGMENTS USING INNOVATIVE SUBSTRATES

Teaney S; Pfaff G; Nitta K

Details are given of new pearlescent pigments based on synthetic silica and alumina flakes coated with metal oxides. Their optical properties are discussed. 7 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; SPAIN; WESTERN EUROPE

Accession no.729111

Item 212

New York, N.Y., Plastics Design Library, 1999, pp.ix,332. 120.00. 22cms. 52

COLORING TECHNOLOGY FOR PLASTICS

Edited by: Harris R M

This book focuses on up-to-date developments in colouring technology for plastics. Pigments and dyes are covered in the first section with information on their chemistry, use, food contact approval and durability. The second section focuses on effective pigment incorporation and discusses factors which influence it, as well as dispersing aids, dispersion methods, and ways to improve process ability and increase efficiency. Further sections discuss the testing of coloured products, methods to decrease variability, establish specifications, and select and design cost effective formulations. Also included is analysis of the effect of colourants on properties of materials, covering their nucleating effect and polymer crystallisation. Extrusion, injection moulding, coating and welding are examined in relation to colourants, as are chapters on health and safety and special effects.

Accession no.725342

Item 213

European Chemical & Polymer Engineer

Dec.1998, p.25/8

COLOUR VARIABLE PIGMENTS WILL ALLOW DESIGNERS NEW DECORATIVE IDEAS

Macdonald W

What at first looks like an optical illusion achieved by pigments is a very specific development, which needed considerable physical and chemical expertise to realise. The result is so-called effect pigments, or colour-variable pigments, which show 'colour flop' or goniochromicity, where the colours vary depending on the viewing angle. Some emphasis is made on developments in this field by BASF.

BASF AG

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.724231

Item 214

Journal of the Textile Institute - Part 1: Fibre Science and Textile Technology

89, No.4, 1998, p.657-68

DYEING OF POLYOLEFIN FIBRES IN SUPERCRITICAL CARBON DIOXIDE. II. THE INFLUENCE OF DYE STRUCTURE ON THE DYEING OF FABRICS AND ON FASTNESS PROPERTIES

Bach E; Cleve E; Schollmeyer E
Deutsches Textilforschungszentrum Nord-West eV

Dyeing of gel-spun PE fibres of low and high draw ratio, PP fibres, and PETP fibres was carried out in supercritical carbon dioxide at 280 bar and in water under optimum dyeing conditions at 120 C. The influence of the chemical structure of different disperse azo and anthraquinone dyes on the dye uptake and also on the washing-, sublimation-, and light-fastness of the fibres was presented. 23 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.721406

Item 215

Additives for Polymers

Feb.1999, p.3

BLUE FLUOROCARBON EQUALS THE SPECIFICATION OF CARBON BLACK

An unusual blue pigmentation has been developed by seal manufacturer Forsheda Dowty to distinguish special fluorocarbon-based elastomer O-rings from the conventional black versions. As the carbon black pigment also plays a key role in improving the physical properties of the compound, replacement with another pigment while maintaining the original high specification proved quite a technical problem. The conventional seal is used in a safety-critical application requiring resistance to hydrocarbons, coupled with good performance at low temperature. Typical applications include automotive fuel injection upper seals and pressure regulators. The user, however, needed a seal to meet the same specification but in a different colour, for a number of reasons, including the need to aid visual differentiation of components. The new seal, manufactured by Malta-based Forsheda Dowty O-Rings, has been approved by Ford to its new material specification WSE-M2D401-A2. This abstract includes all the information contained in the original article.

FORSHEDA POLYMER ENGINEERING

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.719036

Item 216

Plastics Additives. An A-Z reference.

London, Kluwer, 1998, p.485-98. 5

PIGMENTS FOR PLASTICS

Christie R M
Dominion Colour Corp.
(Institute of Materials)

Pigments and dyes are distinctly different types of colourants. A pigment is a finely-divided solid which is essentially insoluble in its polymeric application medium. Pigments are incorporated by a dispersion process into the polymer while it is in a liquid phase and, after the polymer solidifies, the dispersed pigment particles are retained physically within the solid polymer matrix. In contrast, a dye dissolves in the polymeric application medium and is usually retained as a result of an affinity between individual dye molecules and molecules of the polymer. Pigments are generally preferred to dyes for the coloration of plastics mainly because of their superior fastness properties, especially migration resistance. The optical role of a pigment can extend wider than simply providing colour, because it plays a decisive part in determining whether the medium is opaque or transparent. Pigments may often perform useful functions that are more wide-ranging than their optical role, for example mechanical reinforcement or the inhibition of polymer degradation. On occasions, the incorporation of pigments can produce problems in plastics, such as the warping of polyolefins as a result of uncontrolled nucleation. Aspects covered include requirements of pigments for plastics application, inorganic and organic pigments and pigments for special effects. 5 refs.

USA

Accession no.718863

Item 217

Plastics Additives. An A-Z reference.

London, Kluwer, 1998, p.217-25. 5

DYES FOR THE MASS COLOURATION OF PLASTICS

Bente L A
Keystone Aniline Corp.
(Institute of Materials)

In the few short years since 1856, when mauve was discovered by Perkin, there has been a furious effort to develop commercially viable dyes for coloration of all media. Plastic resins ever since the invention of phenolics have been coloured with both dyes and pigments. Dyes, as opposed to pigments, are soluble in or have an affinity for the media being coloured. As dyes are scrutinised in the polymer, this molecular dispersion has the ability to develop much brighter and cleaner colours than pigments that derive their colour from a crystal matrix. The trade-off for this brightness is reduced light and heat stability from pigments. In recent years heavy metal pigments have been legislated out of use due to their supposed toxicity. This has necessitated an increase in the total number of colourants that can replace the high chroma colorants of lead and cadmium in specialty resins. Dyes are classified and discussed by structure. To aid in this identification, the AATCC and The Society of Dyers and Colorists have published the Color Index. This publication details dye

classifications by structure, generic name and an identifying Constitution Number. Other information listed is solubility parameters, heat and light stability and chemical resistance. Recently, the larger dye manufacturers have chosen not to disclose a great deal of information concerning new dyes. Aspects covered include azos, anthraquinone, quinophthalone, perinone, vat dyes, sulphur dyes, methine and polymethine, azine, benzodifuranones and photochromic dyes. 2 refs.

USA

Accession no.718835

Item 218
Patent Number: US 5821287 A 19981013
PHOTOCHROMIC PIGMENT
Hu A T; Wang W H
Taiwan,National Science Council

Disclosed is a reactive photochromic spirooxazine pigment of given formula. It exhibits heat resistance up to 241C and may be added to low melting PETP for direct melt spinning to produce photochromic fibre. The reactive double bond of this compound can be copolymerised with other vinyl monomers to obtain high molec.wt. photochromic materials used for photochromic eye glasses and/or photochromic coating.

TAIWAN

Accession no.718431

Item 219
Chemistry & Industry
No.3, 1st.Feb.1999, p.92-8
OUT OF THE BLUE
McKeown N B
Manchester,University

The blue pigment copper phthalocyanine has been around for 70 years, but recently, modified phthalocyanines have been finding uses in several high-tech applications. This comprehensive article supplies a detailed analysis of the development of phthalocyanines as functional materials. Information is provided on phthalocyanine synthesis, IR-absorbing phthalocyanines, catalysis and redox behaviour, and the electronic properties of phthalocyanines. Recent reports describe the use of phthalocyanines within organic light-emitting diodes, as electrochromic materials, as substrates for the chromatographic separation of mixtures of polycyclic aromatic hydrocarbons or fullerenes, and as precursors for nitrogen-containing carbon nanotubes. 20 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.718277

Item 220
Modern Plastics International
29, No.1, Jan.1999, p.86-8
PEARLESCENT PIGMENT PIZAZZ REQUIRES COMPLEX EVALUATION
Carroll J; Dyer K
Engelhard Corp.
Edited by: Kaplan W A

The importance is stressed of careful sample preparation and the use of instrument-based data for the assessment of pearlescent colour. Difficulties of accurately measuring the colour and appearance of pearlescently pigmented plastics are discussed, and the use of a goniospectrophotometer is described. The use of goniospectrophotometers and improved control of measurement conditions is shown to eliminate subjective results and also allow for data transfer.

USA

Accession no.711780

Item 221
Plasticulture
No.115, 1998, p.27-35
English; French
NEW INTERFERENCE FILM FOR CLIMATE CONTROL
Verlodt I; Verschaeren P
Hyplast NV

The composition and performance of Kool Lite Plus interference films developed by Hyplast and Klerk's for horticultural use are examined. These films contain a pearlescent pigment developed by Merck, and which is designed to reflect solar heat without adversely affecting the transmission of photosynthetically active radiation. Results are presented of trials undertaken in southern Tunisia in which these films were used to cover tunnel greenhouses for tomato cultivation. 7 refs.

KLERK'S PLASTIC INDUSTRIE BV; MERCK KGAA

BELGIUM; EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; TUNISIA; WESTERN EUROPE

Accession no.710639

Item 222
British Plastics and Rubber
Nov.1998, p.23
MASTERBATCH GIVES FOUR-TONE COLOUR SHIFT

Gabriel-Chemie has developed a new colour masterbatch range which gives a four tone shift effect, it is briefly reported. This has been done by treating the mica platelets, as used in a conventional pearlescent colourant, with coatings that give a different reflected wavelength.

GABRIEL-CHEMIE

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.705211

Item 223
Additives for Polymers
Nov.1998, p.2-3

NOVEL RED PIGMENT FILLS A NEW SPACE, COULD SAVE 50%

Engelhard has introduced a novel blue-shade red azo pigment that occupies a new colour space in plastics and powder coatings. It is briefly reported that Engeltone 1115 pigment complies with FDA extractable limits for food contact and is heat stable up to 300C in ABS.

ENGELHARD CORP.
USA

Accession no.702589

Item 224
Promoting the Science of Colouring Plastics.
Conference proceedings.
St.Louis, 1st-2nd Oct.1996, paper 16. 52
PERYLENES AS COLOURANTS FOR PLASTICS
Goldstein S
BASF Corp.
(SPE,Color & Appearance DIV.; SPE,St.Louis Section)

Perylenes as a class of colorants should be considered when seeking for a high performance red pigment when working within the parameters listed. These materials have been used to replace cadmiums in various applications. When looking for high heat stability and lightfastness in a dye, perylenes are an excellent choice, especially in the edge effect area. 3 refs.

USA

Accession no.701773

Item 225
Promoting the Science of Colouring Plastics.
Conference proceedings.
St.Louis, 1st-2nd Oct.1996, paper 15. 52
EFFECT OF IR REFLECTING BLACK PIGMENT SELECTION ON WEATHERABLE R-PVC
Burkhart G
Cerdec Corp.
(SPE,Color & Appearance DIV.; SPE,St.Louis Section)

IR reflecting black pigments are commonly used in R-PVC applications where excellent weatherability and low heat build-up are primary requirements. A few of the application areas with these requirements are vinyl siding and vinyl window profiles. In both of these areas, the colour hold or weatherability and the degree of heat build-up are key factors in the product's performance. It has been well documented that the IR reflecting black pigments give superior performance with regard to heat build-up over alternative black pigments. Within the IR reflecting black pigments, essentially three basic types with regard to colour and composition can be defined. One area is covered by Pigment Black 30s - CrFeNiMn (approx. 18% as Fe), which are typically blue-green in shade. The other two types are both classified as Pigment Green 17s (CrFe) which differ with respect to the Cr:Fe ratio. The two regions can be classified as approximately 11% Fe containing pigments, which are in the red/yellow colour space and approximately 34% Fe containing pigments, which are red/blue in shade. An attempt is made to differentiate the performance of the three black pigment ranges as individual pigments and in a few typical vinyl siding shades. 2 refs.

USA

Accession no.701772

Item 226
Promoting the Science of Colouring Plastics.
Conference proceedings.
St.Louis, 1st-2nd Oct.1996, paper 2. 52
SYSTEMATIC STUDY OF MASS COLOURATION OF POLYAMIDE RESINS
Bente L; Koerner D
Keystone Aniline Corp.
(SPE,Color & Appearance DIV.; SPE,St.Louis Section)

With the elimination of most heavy metal colourants and even well established organic colorants such as azo dyes, the palette of potential colourants has decreased over the last years. In addition to this reduction, the demands that have been placed on the colourant package have become much more stringent. For many years the mass colouration of polyamide resins has been difficult. Colourants historically used to colour many other resins have not found application in these resins. Many at first thought this problem to be more heat-related, but in the recent years it has become evident that normal colourants, both pigments and dyes, are reacted with the amide system and ruined by discoloration due to the loss of conjugation in the colorant molecule. The best colourant systems today includes resin soluble colourants, along with opacifying colorants and/or fillers. Details are given.

USA

Accession no.701759

Item 227
Promoting the Science of Colouring Plastics.
Conference proceedings.
St.Louis, 1st-2nd Oct.1996, paper 1. 52
SCIENCE OF COLOUR DEMYSTIFIED: A PRIMER FOR THE NON-SPECIALIST
Harris B M
Hanna M.A.,Color Technical Center
(SPE,Color & Appearance DIV.; SPE,St.Louis Section)

The simple concept of 'colour' is one of the most complex collections of physical, chemical and physiological phenomena that science has ever attempted to describe. Nevertheless, human inquisitiveness has driven to discover a number of general principles regarding this aspect of nature. An understanding of these of principles not only enhances an appreciation of colour, it also serves as a springboard for creating colour in new ways. The basic principles of colour and colour vision are reviewed, together with the

variety of special effects that have caught the consumer's eye: fluorescence and phosphorescence, pearlescence and iridescence, and colours that can be switched on and off. The latter include colours that are triggered by changes in temperature, light, moisture and pressure.

USA

Accession no.701758

Item 228
Polymers Paint Colour Journal
188, No.4409, Oct. 1998, p.42-4
NEW CLASS OF TREATED ALUMINIUM PIGMENTS
Fetz A; Greiwe K; Birner H
Eckart-Werke

A new class of aluminium pigments with a champagne colour metallic appearance are claimed to offer new styling effects to manufacturers of products and cars, especially when they are used in combination with transparent colour pigments to create novel colour flops. Aloxal pigments have been created by the chemical vapour deposition of transparent, highly refractive iron oxide on aluminium pigments. Their optical properties are described as being a combination of mirror reflection at the aluminium surface, absorption caused by the iron oxide, and interference of the light reflected from the upper surface of the iron oxide and the light reflected from the iron oxide/aluminium interface. Details are given of their synthesis, light stability, and optical properties. 8 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.701524

Item 229
Farbe und Lack
103, No.4, 1997, p.217/26
German
NEW LOOK AT THE DISPERSING PROCESS AND THE DEVELOPMENT OF COLOUR INTENSITY
Volz H G
Bayer AG

Previous work has shown that the dispersion process can be quantitatively described as splitting into large and small particles, into the vessel wall or into grinding agents. At the time, however, not all parameters were accessible. It is now shown how a compensation calculation can be carried out with all data. In the experimental section, the new process is verified using two transparent iron oxide pigments. Coincidence of curves with experimental points was astonishingly good. 4 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.701023

Item 230
European Plastics News
25, No.9, Oct.1998, p.65
ULTRAMARINE BLUE FOR PETP

It is briefly reported that Holliday Pigments has launched Premier F, its first ultramarine blue for use in PETP. Premier F has a very fine particle size, which significantly reduces the haze, allowing it to be used in transparent PETP packaging. It can also be used in the colouring of fibres. An enhanced version, Premier DFNR, is aimed specifically at moisture-sensitive polymers such as PETP and is dried to a very low moisture content.

HOLLIDAY PIGMENTS LTD.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.698873

Item 231
Advances in Plastics Technology. Conference proceedings.
Katowice, Poland, 9th-11th December 1997, Paper 5. 8
PIGMENTS FOR SPECIAL EFFECTS AND FUNCTIONALITY IN PLASTICS
Gurges R
Merck KGaA
(Institute of Plastics & Paint Industry)

The use of pearlescent pigments in the colouring of plastics is discussed, with emphasis on 'interference pigments', gold/metallic lustre additives, suitable applications and the marking of different materials with laser sensitive pigments.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.694483

Item 232
Modern Plastics International
No.9, Sept.1998, p.98-104
COLOURANTS

The latest developments in colourants are outlined. These include thermochromic concentrates, metallic-effect masterbatches, photoluminescent concentrates, specialised white masterbatches for laminations and labels, sparkle-effect products, masterbatches for agricultural mulch films and laser-markable concentrates.

WORLD

Accession no.692904

Item 233
Antec '98. Volume III. Conference proceedings.
Atlanta, Ga., 26th-30th April 1998, p.2594-5. 012
ULTRAMARINE BLUE, AN OLD PIGMENT, A NEW PROCESS
Guilmin T
Prayon Pigments SA
(SPE)

Ultramarine Blue is an inorganic pigment which has been used all over the world for centuries. Sodium aluminosulphosilicate is known as lapis lazuli in its natural form. In 1826, J.B.Guimet invented synthetic Ultramarine Blue produced via a batch process. It was not until 1993 Prayon Rupel invented a continuous production process for this pigment. This process has been evaluated and developed for the last four years on a pilot plant. Today, the industrial plant is running under the same conditions as the pilot plant. This evolution in production has to introduced at least the same level of quality as the batch process, and preferably some specific advantages for the end user. Some of these studies are presented.

BELGIUM; EUROPEAN COMMUNITY; EUROPEAN UNION; WESTERN EUROPE

Accession no.692789

Item 234
Antec '98. Volume III. Conference proceedings.
Atlanta, Ga., 26th-30th April 1998, p.2589-93. 012
REACTIVE TRAPPING OF 3,3-DICHLOROBENZIDINE DECOMPOSITION PRODUCTS IN POLYETHYLENE-BASED DIARYLIDE PIGMENT CONCENTRATES
Anjowski W; Dobbin C J B
Colortech Inc.; Midland,Industrial Research & Development Institute
(SPE)

Concerns over the thermal decomposition products of diarylide pigments in PE matrices have severely limited the use this versatile and cost-effective pigment family in many colourant applications. A strategy for the reactive trapping of 3,3'-dichlorobenzidine, a potential human carcinogen formed during the high temperature processing of PE concentrates, is discussed. Chemical trapping tests made using maleic anhydride modified polymer additives show favourable reactivity towards 3,3'-DCB in model systems. The results of laboratory screening trials with Pigment Yellow 13 and Pigment Yellow 83 are also reported. The apparent complexity of the diarylide pigment decomposition reaction in LLDPE at typical processing temperatures (greater than 200 deg.C) make isolation, analysis and quantification of residual 3,3'-DCB levels extremely difficult. 9 refs.

USA

Accession no.692788

Item 235
Antec '98. Volume III. Conference proceedings.
Atlanta, Ga., 26th-30th April 1998, p.2586-8. 012
METALLIC LOOKING PLASTICS WITH NEW SILVER AND COLOURED ALUMINIUM PIGMENTS
Bunge H-H
Eckart America LP
(SPE)

The use of aluminium pigments in plastics has presented a problem in the past due to the flow line they caused in injection moulded parts. By using aluminium pigments with an average particle size of 60 to 330 mu and larger, it is possible to avoid these flow lines and produce plastic parts with a metallic appearance. This concept has been taken one step further by depositing colourants on these aluminium pigments, thereby creating blue, green and golden metallic colourants that can be used in plastics without flow lines. These pigments offer exceptional styling effects by themselves and in combination with other colourants, including bronze pigments. 1 ref.

USA

Accession no.692787

Item 236
Pitture e Vernici
74, No.11, June 1998, p. 37-42
English; Italian
PEARLESCENT PIGMENTS FOR POWDER COATING
Hirth U-A; Kieser M; Stahlecker O; Denne I
Merk KGaA

Developed in the late 1950s, powder coatings are now undergoing rapid growth. This increase in market share has been almost exclusively at the expense of liquid coatings and has been promoted by the many benefits of the technology. The success of powder coatings has been achieved by co-operation between raw materials producers, powder coating producers, powder coating users and equipment manufacturers. The future of powder coatings technology will continue to be dependent on this co-operation. This is especially the case with respect to solving basic research and development problems. By 1989 the European powder coatings market reached a volume of 120,000 tonnes, rising to an estimated 155,000 tonnes in 1992. The worldwide market volume for 1990 can be estimated to be approximately 270,000 tonnes. Market studies indicate that the European powder coatings market could reach 230,000 tonnes by 1999. The largest markets for powder coatings are the building industry, metal furniture and metal appliances. About 47% of powder coating production is used in these applications.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.687909

Item 237
Polyblends '97. Retec proceedings.
Boucherville, Qc., 9th-10th Oct.1997, p.252-67. 6125
COLOURING THERMOPLASTIC BLENDS AND ALLOYS
Harris R M
Ferro Corp.
(SPE; Industrial Materials Institute; National Research Council of Canada)

Some of the special features of polymer blends and alloys presenting hurdles to the colour formulator are discussed, together with the costs associated with overcoming them. The major classes of colourants suitable for use in high performance polymer blends and alloys are surveyed, and some helpful signs to help spot the pitfalls one may encounter in using them are provided.

USA

Accession no.683340

Item 238

Patent Number: US 5690857 A 19971125

THERMOCHROMIC EFFECT PIGMENT AND PROCESS FOR PRODUCING THE SAME

Osterried K; Herbski M; Sage I C

Merck Patent GmbH

A thermochromic effect pigment is disclosed comprising a thermochromic liquid crystal material encapsulated with a polymer and coated with one or more inorganic metal oxides or nearly insoluble metal salts selected from Al2O3, SnO2, ZrO2, TiO2, CaO, SiO2, ZnO, MgO or BaSO4. The pigment is stable in solvent-based formulations and can be used as a colourant in the form of an aqueous suspension or as a powder in lacquer compositions, plastic compositions, dyed filter compositions, dyed glass compositions, dyed cosmetic compositions, printing ink compositions, and in hair colouring agents.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.682978

Item 239

Polymers Paint Colour Journal

188, No.4404, May 1998, p.24/6

COLOURED ALUMINIUMS PROVIDE SPARKLE FOR AUTOMOTIVE FINISHES

Kennedy A W

The growth in popularity of metallic and pearlescent automotive finishes, is discussed, and the use of aluminium and mica flake pigments is examined. Advantages of coloured aluminium flakes and high chromaticity aluminium pastes are examined.

USA

Accession no.681303

Item 240

Modern Plastics Encyclopedia

74, No.13, 1998, p.C21-2

WIDE RANGE OF REDS, YELLOWS AND ORANGES MEET MOST PIGMENT NEEDS

Valin R

Engelhard Corp.

Organic colourants are a diverse group of compounds that successfully provide essential shades, heat stability, light fastness and a wide range of colours that often better inorganic colourants in colour strength, brightness and transparency. A table is presented showing properties for selected organic colourants.

USA

Accession no.680776

Item 241

Polymer Additives: What's new and review. Retec proceedings.

Ft.Mitchell,Ky., 20th-22nd Oct.1997, p.241-51

BEYOND COLOUR: MODIFIERS AND ADDITIVES THAT AFFECT APPEARANCE

Burgess A

Hanna M.A.,Color

(SPE,Polymer Modifiers & Additives Div.)

The ability to produce unique and appealing special effects is a powerful marketing tool for manufacturers of plastics and other parts. This paper surveys the development of traditional and newer special effects technologies and describes some of the challenges encountered in developing them. Special effects discussed include fluorescent, phosphorescent and pearlescent colours, dimensional stone, simulated metal, wood and glass, and camouflage. 4 refs.

USA

Accession no.679964

Item 242

Plastics News(USA)

10, No.3, 16th March 1998, p.19

BAY RESINS' RED NYLON RAISES EYEBROWS AT SAE

Esposito F

Custom compounder Bay Resins recently exhibited its difficult-to-achieve, cadmium-free red colours in nylon at SAE '98. The coloured nylons, whose primary automotive use has been in seat belt components, have been commercialised for about four years and were drawing the most customer inquiries of products displayed at the show in Detroit. Brief details are noted.

BAY RESINS INC.

USA

Accession no.676482

Item 243

Additives for Polymers

March 1998, p.2

SIX PIGMENTS BROUGHT TO US FOOD-CONTACT STANDARD

Providing compounders with new options for colour and performance in food-contact formulations, pigment manufacturer Engelhard has brought six organic and inorganic pigments into full compliance with current US Federal regulations for use in food packaging. The

pigments, Engeltone Orange 2920 and Scarlet 1112 organic, and Meteor Yellow Buff 7370, Meteor Plus Bright Gold 9350, Bright Green 9440 and Teal Blue 9530 complex inorganic pigments, comply with all current specifications of the US Food and Cosmetic Act (Conditions of Use A-H, 21 CFR176.170(c), Table 2) and other applicable food additive regulations. They can be used with many resin families, including PP, PE and general purpose PS. High colour strength, brightness and heat stability of 287C are offered by the two Engeltone grades, which under current regulations can be used at levels of less than 1%. Excellent lightfastness and stability at temperatures above 426 deg.C are offered by the Meteor and Meteor Plus grades, which can be used at levels of less than 2%. This abstract includes all the information contained in the original article.

ENGELHARD CORP.
USA

Accession no.676388

Item 244
Kunststoffe Plast Europe
88, No.3, March 1998, p.23-4; p.362/6
BLACK IS OUT
Kanja U; Ohleier H; Wetzel P

The demands placed by the automotive industry on plastics and their colouring are becoming more and more comprehensive. A uniform appearance is playing a decisive role here in addition to safety. Where colouring is concerned, this means that in addition to the natural demands on the colourant, such as heat stability, light fastness and good colour matching with the other car parts, the plastics parts must also have good weather stability and experience only minor shrinkage (warpage). Fluorescence and metallics are the current trends in car exteriors. The organic pigments necessary for these effects must exhibit high weatherability in addition to brilliance. The modified pigments used in car interiors have to withstand high fastness requirements in some applications.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.676371

Item 245
Cleveland, Oh., 1996, pp.9. 11ins. 27/1/98.
DAY-GLO PRODUCTS
Day-Glo Color Corp.

Tests were carried out to evaluate the reduction in plate-out and the improvements in processability of fluorescent pigments in injection moulding and blow moulding applications, by the addition of silica. Results are presented of an injection mould and blow pin plate-out test, which demonstrated that plate-out can be dramatically reduced by the addition of either fumed or precipitated silica. 4 refs.

USA

Accession no.671915

Item 246
Journal of Physics D. Applied Physics
31, No.5, 7th March 1998, p.463-71
PHOTOMODIFICATION OF POLYMER FILMS: AZOBENZENE-CONTAINING POLYURETHANES
Itoh M; Harada K; Matsuda H; Ohnishi S; Parfenov A; Tamaoki N; Yatagai T
Tsukuba,University

Details are given of the photoinduced modification of PU substituted with azo dye. Holographic gratings were formed in the PU films by exposure to argon laser light. The involvement of irreversible photochemical processes and/or the transport of azo polymers during trans-cis photoisomerisation are discussed. 7 refs.

JAPAN

Accession no.670603

Item 247
Patent Number: US 5662707 A 19970902
POLYMERISABLE YELLOW DYES AND THEIR USE IN OPHTHALMIC LENSES
Jinkerson D L
Alcon Laboratories Inc.

Novel polymerisable yellow dyes are disclosed. Additionally, novel and known dyes are used to block or lower the intensity of the blue light transmitted through ocular lenses and other windows.

USA

Accession no.670202

Item 248
Polymer News
22, No.12, Dec.1997, p.431
NEW OPPORTUNITIES IN IRON OXIDES

Intertech has undertaken a new multi-client study on iron oxides for colourants and electromagnetics to forecast markets, review production processes and appraise the strategic outlook to 2005 for this versatile, low cost and environmentally friendly compound. The global market for iron oxides for pigment and electromagnetic applications is estimated to be over one million tons, representing a value in the region of 750 million US dollars. With applications as varied as concrete block, paints, cosmetics, pet food, magnets, chemical catalysts and airbags, iron oxides compete in an extremely complex marketplace with widely varying market specifications and product pricing. Production methods too, are highly varied - some are suitable for some specific end uses but not for others. The Intertech multi-client study is intended for companies producing both synthetic and natural iron oxides; for suppliers of iron oxide pigments and oxides used in hard and soft ferrites and to current and potential users of iron oxides in such applications as plastics, construction products, paints, magnets, inks and toners,

cosmetics, recording media and catalysts. Brief details are noted.

INTERTECH CORP.
USA

Accession no.670133

Item 249
Plastics in Canada
Feb./March 1998, p.57-8
COLORANTS FIND MIDDLE GROUND

Developments in pigment technology are reviewed as companies seek to find a balance between environmental impacts, costs, ease of use, and performance qualities. It is claimed that new basic pigment chemistries are unlikely to emerge unless they are speciality products serving market niches that allow for high pricing, but that new materials that use variants on existing types of chemistries continue to emerge.

CANADA

Accession no.669214

Item 250
Modern Plastics International
28, No.1, Jan.1998, p.109
SILICA COATED ALUMINIUM

Silica coated aluminium and bronze pigments from Eckart-Werke produce silver and gold optical effects in vinyls and elastomers. Stapa D Resist masterbatches achieve fast homogenous distribution of the metallic pigments, it is briefly reported. These silica-coated materials will not promote catalytic decomposition in PVC.

ECKART WERKE GMBH
EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.667254

Item 251
Pitture e Vernici
72, No.4, April 1996, p.21/8
Italian; Spanish
NEW POSSIBILITIES IN THE FORMULATION OF COLOURANTS
Freitag W; Bieleman J; Ortelt M

Results are presented of formulation studies aimed at developing colourants universally compatible with solvent-based coatings. The effects of each component, including pigments, polymeric dispersing agents, a ketone resin, oligomeric wetting agents and methoxypropyl acetate solvent, were determined for a model alkyd resin coating composition formulated with a red colourant. Changes in properties such as viscosity, gloss and colour were measured for different concentrations of the various components.

HULS AG; DSM RESINS BV; SERVO DELDEN BV
EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; NETHERLANDS; WESTERN EUROPE

Accession no.666464

Item 252
Journal of Applied Polymer Science
67, No.2, 10th Jan.1998, p.371-82
INFLUENCE OF ACID DYES ON THE THERMAL BEHAVIOUR OF NYLON 66
Weiping Lin; Gowayed Y; Kotha S
Auburn,University

To reveal the effect of acid dyes on the melt processing of recycled nylon 66 from post-consumer carpet waste, 17 acid dyes with different chemical structures were used to dye a nylon 66 yarn. The thermal stability of dyestuffs, the thermal degradation of the dyed nylon 66 during compression moulding, and the melting and crystallisation of the dyed nylon were investigated. 19 refs.

USA

Accession no.665760

Item 253
Plastics in Canada
4, No.5, Oct./Nov.1997, p.45-6
BRIGHT PEARLS

This artice discusses pearlescent pigments in detail, including classic pearlescent pigments, disadvantages, processing, and new and traditional applications. Information is provided by representatives of several important players in the field of pearlescent pigment production.

HANNA M.A.,COLOR; BDH INC.; CLARIANT CANADA
CANADA

Accession no.665231

Item 254
Waterborne Coatings and Additives.
Cambridge, Royal Society of Chemistry, 1995, p.180-9.
6A3
METALLIC PIGMENTS FOR WATER-BASED COATINGS
Reisser W; Fetz A; Roth E
Sparte Aluminiumpigmente
Edited by: Karsa D R; Davies W D
(Akcros Chemicals UK Ltd.)

The problem of using aluminium pigments for waterborne coatings is the exothermic reaction caused when combining water and aluminium. When converting aluminium into the flake form of pigment, the surface area is greatly increased, causing a major increase in surface reactivity with water. Until the 1970s it was almost impossible to use conventional aluminium pigments in ready mixed stable waterborne coatings, and it was therefore necessary to use a two-component system. Meanwhile, pigment and paint manufacturers have succeeded in developing a wide range of storage stable one-component systems for a variety of coating applications. These coatings are manufactured from specially prepared aluminium pigments that are even used

in the demanding automotive industry, where only the highest quality is acceptable. Today production line coating capability with waterborne metallic paints is performed routinely. 32 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.662607

Item 255
Recycling Textile and Plastic Waste. Conference proceedings.
Bolton, April 1995, published 1996, p.165-71. 8(13)
DYESTUFFS: MYTHS EXPLODED, PROBLEMS AIRED
Burdett B C
British Textile Technology Group
Edited by: Horrocks A R
(Bolton Institute; British Textile Technology Group)

Colour sells merchandise, whether apparel, furnishings or household. To satisfy the public demand, an excess of some 700,000 tonnes of dyes are consumed annually. Their application to textile materials is varied and, in many instances, not at all beneficial to the environment. Those working in or are connected with the colour-using industries are unlikely to say that they are satisfied with the environmental friendliness of their procedures. Aspects covered include safe dyestuffs (natural dyes), natural dyes and the environment, natural dye mordants, toxicity, azo dyes and the need for chemical understanding. 7 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.662589

Item 256
Addcon '96. Conference proceedings.
Brussels, 21st-22nd May 1996, paper 17. 5
PROBLEMS AND PROGRESS IN COLOURATION WITHOUT CADMIUM AND LEAD-BASED PIGMENTS
Sykes R C
Ciba Pigments
(Rapra Technology Ltd.; Modern Plastics International)

A number of well publicised legislative and public opinion factors have obliged many plastics processors and end-users to move away from the use of cadmium and lead based pigments in recent years. The focus is currently on reduction of the amount of these elements entering the food chain via waste disposal sources. In the USA, CONEG and related legislation prohibits the sale of packaging materials to which cadmium, lead, mercury and hexavalent chromium or their compounds have been intentionally added. The European Community has enacted equivalent legislation, Directive 94/62/EC, differing from the US requirements only in timing. Furthermore, in Europe, the European Community Directive 91/338/EEC regulates the polymers in which cadmium compounds may be used. Similar legislation for lead-based pigments in the plastics industry does not exist today and at this time seems unlikely. Thus lead chromates are still used in Europe to a much greater extent than cadmiums. It is shown how the challenge of colouration without cadmium and lead pigments has been addressed, outlining some of the strategies which have been adopted to deal with it.

SWITZERLAND; WESTERN EUROPE

Accession no.662108

Item 257
Addcon '96. Conference proceedings.
Brussels, 21st-22nd May 1996, paper 16. 5
TOXIC USE REDUCTION WITH 'GREEN' HEAVY METAL-BASED PIGMENTS
Swain R D
Chroma Corp.
(Rapra Technology Ltd.; Modern Plastics International)

Normally heavy metal-based pigments are thought to be red, orange and yellow colours. Details are given here of 'green' heavy metal-based pigments. It is demonstrated that when the principles of risk assessment are applied, pigmentary heavy metals are ecologically and economically the correct forms to be using when colouring plastic parts. Many people in both the legislative and regulatory worlds view heavy metals as existing only in the hazardous or toxic form. However, heavy metals exist in two forms - a bound form and an unbound form. The unbound forms are all elements, they are soluble and generally bioavailable, and while all of these elements exist in nature they only present a toxic potential if their concentration exceeds a specific threshold. On the other hand, the pigmentary bound forms are chemical compounds which are inert, non-soluble, non-extractable and non-migratory. Aspects covered include pigment manufacture, compounding colourants, plastics fabrication, and the use and disposal of plastics parts.

USA

Accession no.662107

Item 258
Addcon '96. Conference proceedings.
Brussels, 21st-22nd May 1996, paper 15. 5
COMMERCIALISATION AND PERFORMANCE PROPERTIES OF NEW RED INORGANIC PIGMENT
Golowski J W
Rhone-Poulenc North American Chemicals
(Rapra Technology Ltd.; Modern Plastics International)

The commercialisation and performance properties of Rhone-Poulenc's new inorganic Cerium red pigments are outlined.

USA

Accession no.662106

Item 259
Popular Plastics and Packaging
42, No.8, Aug.1997, p.63/74
ALUMINUM PIGMENTS FOR PLASTICS
Kern G M
Siberline Manufacturing Co.

This article investigates the use of aluminium pigments for colouring plastics. It considers: the history of metallic pigments, methods of manufacturing aluminium pigments, their characteristics, plastic grades, compounding techniques, colours, flow and weld lines, safety and the environment. It also highlights "Silvex" and "Sparkle Silvex" aluminium pigments from Siberline Manufacturing Co. of the USA. 5 refs.

USA

Accession no.661099

Item 260
Patent Number: EP 769535 A2 19970423
COLORED METALLIC PIGMENT AND PREPARATION THEREOF
Suzuki M; Nakaminami H; Homma S
Japat Ltd.

A process is disclosed for the production of coloured metallic pigments, as well as these coloured metallic pigments themselves, their use to colour high molecular weight organic material in the mass and compositions or masterbatches containing them. The coloured metallic pigment consists essentially of multiple loose particles of 0.1-1000 micron in size, the particles comprising a core of a transition metal, half metal or alloy, preferably an aluminum flake, and a very fine, substantially continuous, uniform and homogeneous layer of organic pigment particles which is directly in contact with the metallic core. The core may be superficially oxidised. The coloured metallic pigment is prepared by a vacuum deposition process, performed in an apparatus constructed, modified or charged in such a way that the organic pigment gas flows in the direction of the metallic core.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.660495

Item 261
European Plastics News
24, No.10, Nov.1997, p.62
LUXURIOUS EFFECTS FROM MINERALS

It is briefly reported that Microfine Minerals, in collaboration with Mica-Tek, has developed a new range of special decorative effect additives. The Dekorlux range has been designed with unique mineral-based, non-dispersing pigments which are chemically stable and heat resistant, making them ideal for plastic, rubber and paint applications.

MICA-TEK INC.; MICROFINE MINERALS LTD.
USA

Accession no.659355

Item 262
Popular Plastics and Packaging
42, No.7, July 1997, p.83-6
METALLIC DIRECT PIGMENTATION. COLOURING PLASTICS WITH ALUMINIUM PIGMENTS
Kerr J D; Klein B

Metallic direct pigmentation involving the use of polymer-bound aluminium pigments makes it possible to colour plastics from metallic-grey to metallic-white, and with the possibility of achieving pearlescent effects at extremely low degrees of pigmentation. Production of the masterbatches is described, its supply forms and benefits with respect to processing and application.

CHEM IMPEX USHA PVT.LTD.
EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; INDIA; UK; WESTERN EUROPE

Accession no.658985

Item 263
Materiaux & Techniques
85, Nos.1/2, Jan./Feb.1997, p.52-3
French
PHOSPHORESCENT AND HIGH TEMPERATURE RESISTANT RUBBER

An account is given of the properties of Yfestos, a phosphorescent silicone rubber developed by Beele Engineering of the Netherlands. Phosphorescence is achieved by the addition of a small quantity of pigment and is unaffected by short-term exposure to temperatures of 400C. Applications in signs for emergency exits are described.

BEELE ENGINEERING BV
EUROPEAN COMMUNITY; EUROPEAN UNION; NETHERLANDS; WESTERN EUROPE

Accession no.658249

Item 264
Plastiques Modernes et Elastomeres
49, No.2, March 1997, p.36/40
French
MASTERBATCHES: A MORE TARGETTED RESPONSE TO THE COLOURING OF PLASTICS
Gailliez E

The use of pigment and colourant masterbatches in the colouring of plastics is discussed, with particular reference to the colour compounding of automotive parts. The activities of a number of companies in the manufacture of custom masterbatches are examined.

WESTERN EUROPE-GENERAL

Accession no.658232

Item 265
Plastiques Modernes et Elastomeres

49, No.2, March 1997, p.32-5
French
PIGMENTS AND COLOURANTS: MORE AND MORE EFFECTS
Gailliez E

A survey is made of developments by a number of companies in pigments and colourants for plastics. Particular attention is paid to additives providing special effects such as fluorescence, phosphorescence, pearlescence, metallic appearance, thermochromicity and photochromicity.

BAYER AG; CIBA AG; HOECHST AG; CARBONNEL & JACQUEMOT; BASF AG; RIEDEL-DE HAEN AG; SILBERLINE LTD.; MEARL CORP.; MILLIKEN CHEMICAL CO.; MERCK; MATSUI SHIKISO CHEMICAL CO.LTD.
EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; GERMANY; JAPAN; SWITZERLAND; UK; USA; WESTERN EUROPE

Accession no.658231

Item 266
Polymers Paint Colour Journal
187, No.4397, Oct.1997, p.14/9
GO WITH GLOW
Martindill M
Glowbug

With the demand for 'glow-in-the-dark' coatings and colours increasing, formulators are having to familiarise themselves with the materials available and their use, in order to expand their product ranges. They are usually available in three forms: photoluminescent, radioluminescent and chemiluminscent. The development and use of these coatings are presented.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.657836

Item 267
Tyres & Accessories
No.9, 1997, p.62
MICHELIN CORALDO - IN LIVING COLOUR

Michelin has introduced a new tyre - the Coraldo - into the French, Italian and German markets. Aimed at motorists who 'appreciate the design of their car', the Coraido is a coloured tyre, available in yellow (Rio), red (Etna) and green (Nordik). it can be supplied in two sizes, 155/70 R 13T and 175/ 70 R I 3T, allowing owners of small and medium cars to add 'a touch of distinction to their vehicle'. Michelin says that its designers have harmonised colour and tread pattern, with the two elements complementing each other. The colour is integrated into the tread pattern and repeated on the sidewall, while the tread pattern itself is described as 'directional and dynamic'. As well as looking good, it is said to offer high levels of wet grip and low noise generation. There is a rounded central rib, four wide longitudinal grooves to disperse water and 360 tread blocks for even pressure distribution. The colours are made possible by replacing carbon black with silica, and they were chosen carefully after consultation with a specialist agency. The tyre as a fashion accessory is an intriguing concept, and Michelin is taking it seriously, with a methodical programme of monitoring customer reaction so that it can gauge demand for possible future ranges of coloured tyres. This abstract includes all the information contained in the original article.

MICHELIN GROUP
EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; WESTERN EUROPE

Accession no.656998

Item 268
Plastics News(USA)
9, No.21, 21st July 1997, p.23
ATTENDEES PRAISE APPEARANCE TECHNOLOGY
Lauzon M

Colourants technology is reported to have been promoted heavily at the recent NPE '97 exhibition, because it is increasingly important in plastics applications. New appearance effects are on the market and suppliers of other additives, such as antioxidants, UV stabilisers and purging compounds, are improving their products to help support plastics aesthetics. As plastics capture more applications, processors will need more colour options, including better weatherability. Many special effects were displayed at NPE, including marble and metal simulations, and wood fibres, such as those from American Wood Fibers. Wood fibres can make plastic look and feel like wood and can also be a low-cost filler. The highlights of colourant offerings at the exhibition are outlined.

BAY RESINS; CHROMA CORP.; EM INDUSTRIES INC.; COLORTECH INC.; MEARL CORP.; X-RITE INC.; MINOLTA CORP.; GRETAG MACBETH
USA

Accession no.654471

Item 269
Journal of Vinyl and Additive Technology
3, No.2, June 1997, p.107-11
REVERSIBLE DISCOLORATION EFFECTS IN THE PHOTOAGEING OF POLY(VINYL CHLORIDE)
Gardette J L; Lemaire J
Blaise Pascal,Universite

Photochemical degradation of titanium dioxide pigmented PVC leads to a latent discolouration that is revealed only during a further period of storage of the aged material in the dark. This effect is reversible, and photobleaching can be provoked by a new irradiation of the polymer. This behaviour can be attributed to the formation of polyenic

sequences with a short conjugation length, which present an absorption below 400 nm. The screen effect of the pigment protects these polyenes against photooxidation, which permits these polyenes to accumulate in the degraded polymer. 5 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; WESTERN EUROPE

Accession no.650267

Item 270
Modern Plastics International
27, No. 9, Sept. 1997, p.68-72
ADDITIVES PRODUCT GALLERY

A review is presented of a range of colourants which are being developed in a bid for manufacturers to compete on an innovative level. New grades of products are announced and described, as well as specialised products with tailored properties and upgraded versions of workhorse grades, and formulations designed to work with metallocene resins.

USA

Accession no.649410

Item 271
Plastics and Rubber Weekly
No.1700, 22nd Aug.1997, p.15
PRISM PAYS OFF FOR POLYCOLOUR

A new Prism TSE 24TC twin-screw extruder installed at Polycolour Plastics provides the capability to supply quantities down to 2 kilos and up to 20 tonne. Polycolour says it is very close to being able to supply any masterbatch for any process in any quantity. Recent developments include a nylon masterbatch and a range of fluorescent masterbatches.

POLYCOLOUR PLASTICS LTD.
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.647974

Item 272
Plastics and Rubber Weekly
No.1700, 22nd Aug.1997, p.14
CDC EVENT PUTS SPOTLIGHT ON PVC

The colouring of PVC was the theme at the Colorplast conference held in London in March. Replacement of lead chromate is increasingly sought in response to legislation and customer demands. BASF suggests a combination of an inorganic pigment chosen for hiding power, while an organic pigment provides the brilliance. Cookson Matthew's Micraflo range has been developed specifically for rigid PVC. Predispersed, the material allows rapid and uniform colouration within the polymer melt and is formulated to incorporate pigment concentrations of up to 80%.

CDC LTD.
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.647970

Item 273
Plastics and Rubber Weekly
No.1700, 22nd Aug.1997, p.10
INORGANIC PIGMENTS CAUSE LESS WARPAGE

It is briefly reported that Rapra Technology has completed a major study on the warpage of pigmented polyolefin components. The study was commissioned by Holliday Pigments and was designed to clarify the warpage problems often encountered with moulded crates, medical devices, car body parts and closures. It was demonstrated that inorganic pigments such as ultramarines, manganese violet and carbazole violet cause the fewest problems.

RAPRA TECHNOLOGY LTD.; HOLLIDAY PIGMENTS LTD.
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.647961

Item 274
European Plastics News
24, No.7, July/Aug.1997, p.29
HOLLIDAY'S NEW BLUE FOR PETP

It is briefly reported that Holliday Pigments has launched three ultramarine pigment ranges which can be used effectively in colouring transparent PETP. The Premier D range has significantly reduced moisture and so reduces processing problems. Premier F is a very fine particle size ultramarine that is claimed to reduce haze. Premier DFRX combines the benefits of both the D and F ranges with low moisture and fine particle size.

HOLLIDAY PIGMENTS LTD.
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.641121

Item 275
European Plastics News
24, No.7, July/Aug.1997, p.28
CIBA FOOD APPLICATIONS

Ciba Speciality Chemicals has recently received FDA approval for two of its organic pigments, CI Pigment Red 254 and CI Pigment Yellow 110. This will permit their use in packaging for all food types and for applications under conditions from freezing temperatures up to boiling water sterilisation. Both pigment types are available as Microlith monopigment preparations in a number of FDA-compliant carrier resins. This abstract includes all the information contained in the original article.

CIBA SPECIALITY CHEMICALS
SWITZERLAND; WESTERN EUROPE

Accession no.641120

Item 276
Plastics World
55, No.7, July 1997, p.21-4
COLOURANTS/PIGMENTS

New colourant/pigment products introduced by additive suppliers in recent months are outlined. These include ReedSpectrum's enhanced formulations for both copolymer and homopolymer acetal resins, Hanna's colourant for a frosted glass appearance, Milliken Chemical's colourants for flexible and non-flexible PUR and colours for rotomoulding introduced by Teknor Color.
USA

Accession no.641088

Item 277
Rubber World
216, No.2, May 1997, p.50
SCARLET AZO PIGMENT

It is briefly reported that Engeltone 1112 scarlet azo pigment from Engelhard is available for plastics and powder coatings. It has a heat stability of 550F and good chemical resistance. It is said to be generally well suited for packaging and interior applications with polyolefins and PS, as well as for use in epoxy powder coatings.
ENGELHARD CORP.
USA

Accession no.638600

Item 278
Plastics Formulating & Compounding
3, No.2, March/April 1997, p.34-7
COLOR EFFECTS. NEW LOOKS ENHANCE THE VALUE OF PLASTICS
Burgess A R
Hanna M A.,Color

Developments in colour effects to enhance the value of plastics are reviewed, and include the creation of granite effects, marble effects, simulated metals, woods and glass, and camouflage effects. Traditional effects such as fluorescence and pearlescence, and frosted glass effects are discussed, and the developments in colour formulation technology are described which have made these possible.
USA

Accession no.637968

Item 279
Plastics World
54, No.3, March 1996, p.40-4
COLOURANTS

New pigment offerings from US companies are outlined. These include a new high-productivity titanium dioxide, a phosphorescent pigment that glows in the dark for eight hours or more, a proprietary colourant for PU, silicone and epoxy dispersions, lustre pigments and transparent colours with suspended silver sparkles.
USA

Accession no.637588

Item 280
Reinforced Plastics
41, No.6, June 1997, p.17
DSM MOVES TO LEAD-FREE GEL-COAT

It is briefly reported that DSM has reformulated all its gel coats and pigment pastes which contain lead. The move to new formulations is prompted by a number of restrictions relating to materials containing lead. However, the organic pigments used to replace lead chromate have some drawbacks. DSM says it appreciates that some customers may have to change their colours because it will be impossible or very expensive to duplicate existing colours.
DSM BV
BELGIUM; EUROPEAN COMMUNITY; EUROPEAN UNION; WESTERN EUROPE

Accession no.637503

Item 281
Modern Plastics International
27, No.5, May 1997, p.107
TITANIUM DIOXIDE IMPROVES LIGHT STABILITY OF PVC

Research carried out at Sachtleben shows that titanium dioxide can help protect PVC from light degradation. Tests carried out on PVC plates using two titanium dioxide pigments and a precipitated barium sulphate showed that the barium sulphate PVC showed a continuous loss of gloss, a steady decrease in brightness, and an increase in yellow hue, whereas photostable titanium dioxide doped with aluminium showed only diminishing yellow hue. Details are also included of the company's Hombitan grades of titanium dioxide pigments.
SACHTLEBEN CHEMIE GMBH
EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.634954

Item 282
Packaging Review South Africa
23, No.3, March 1997, p.21
FINISH OF PEARL

Naturally-occurring mineral mica forms the basis of Iriodin (Merck's range of pearl lustre pigments). When coated with a fine layer of titanium dioxide it results in a transparent, silver-white pigment with the soft, deep shine that is characteristic of mother-of-pearl. By varying the particle size of the pigments, both glittering and silky-matte lustre effects can be created and when the thickness of the titanium dioxide layer on the mica is increased by a minute amount, the pigments emit a coloured shine due to the interference of light waves. These 'interference' pigments can be used on their own or in combination with traditional pigments. Unusual and attractive iridescent colours can be produced with Iriodin interference pigments which are available in yellow and various shades of red, violet, blue and green. The range also includes gold lustre pigments manufactured

by precipitating a little iron oxide onto the mica as well as the titanium dioxide. Bronze coloured and copper red pigments are a further feature of the Iriodin range. These pearl lustre pigments also have a nucleus of mica but are coated with iron oxide. Details are given.

MERCK
SOUTH AFRICA

Accession no.634312

Item 283
Kunststoffe Plast Europe
87, No.3, March 1997, p.12-3
REVOLUTION UNDER THE BONNET?
Fritzche T; Pankewitz W; Wolf P

Metallic-coloured polyamides can be used for many different under-the-bonnet components. The metallic pigments required for this application sector must have minimal tendency to flow marks, give the appearance of an aluminium pressure diecasting and withstand temperatures of up to 300 deg.C. Aspects covered include requirements for under-the-bonnet design, cost advantages of direct colouration and requirements for metallic pigments and base material.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.631975

Item 284
Patent Number: EP 769535 A2 19970423
COLOURED METALLIC PIGMENT AND PREPARATION THEREOF
Suzuki M; Nakaminami H; Homma S
Japat Ltd.

This pigment consists essentially of multiple loose particles of 0.1 to 1000 micrometer size each, which comprise a core of a transition metal, half metal or alloy, preferably an aluminium flake, and a very fine, substantially continuous, uniform and homogeneous layer of organic pigment particles, which is directly in contact with the metallic core. The core may be superficially oxidised. The pigment is prepared by a vacuum deposition process, which is carried out in an apparatus constructed, modified or charged in such a way that the pigment gas flows in the direction of the metallic core. The pigment can be used to colour high molec.wt. organic material in the mass and in compositions and masterbatches.

SWITZERLAND; WESTERN EUROPE

Accession no.631311

Item 285
Modern Plastics International
27, No.4, April 1997, p.122
DPP REDS

It is briefly reported that Chromophtal DPP Flame Red FP is the latest organic pigment based on Ciba-Geigy's diketopyrrolopyrrol chemistry. It gives bright red shades in vinyls, polyolefins and styrenics. It is targeted at packaging, recreational and household markets where azo pigments now used may lack light fastness, have low colour strength or stain moulds if recommended processing temperatures are exceeded.

CIBA-GEIGY LTD.
SWITZERLAND; WESTERN EUROPE

Accession no.630338

Item 286
Modern Plastics International
27, No.4, April 1997, p.66-9
ADDITIVES ADD A BIT OF REALISM TO SPECIAL EFFECTS
Graff G

To meet the demand for plastics that simulate more realistically the appearance, feel, colours and textures of the materials they replace, additive suppliers are developing formulations that are taking special effects in plastics to a new level of realism. Newly popular effects in plastics include the brushed-metal look, frosted glass, camouflage, mottled and wood-grain.

USA

Accession no.630328

Item 287
Japan Chemical Week
38, No.1917, 13th March 1997, p.1
MERCK EXPANDS JAPANESE BASES FOR PIGMENTS, LIQUID CRYSTALS

It is briefly reported that E. Merck (Germany) has started discussions on the construction of a production facility for a new type of pearlescent pigment at Onahama Plant, Japan. Merck says it will exploit new applications for the product in the automobile industry. Merck Japan has developed pearlescent pigments with unique metallic brilliance at the plant using base material other than mica. Merck has also decided to construct a new R&D centre for liquid crystals in Atsugi.

MERCK E.
JAPAN

Accession no.630269

Item 288
Modern Plastics International
27, No.3, March 1997, p.85
THERMAL STABILITY

It is briefly reported that thermal stability and improved colouring qualities are offered in a new generation of red and orange inorganic pigments from Rhone-Poulenc. Neolor uses rare earths as a replacement for cadmium and lead-based pigments.

RHONE-POULENC SA
EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; WESTERN EUROPE

Accession no.628913

Item 289
Patent Number: US 5528322 A 19960618
POLYMERISABLE YELLOW DYES AND THEIR USE IN OPHTHALMIC LENSES
Jinkerson D L
Alcon Laboratories Inc.

Disclosed are polymerisable yellow dyes along with novel and known dyes, which are used to block or lower the intensity of blue light transmitted through ocular lenses and other windows.

USA

Accession no.625300

Item 290
Patent Number: US 5456749 A 19951010
ANTI-DISCOLOURING PEARLY LUSTRE PIGMENT AND METHOD OF PREPARING THE SAME
Iwasa K; Nitta K; Noguchi T
Merck Patent GmbH

The pigment consists of white titanium dioxide-coated mica grains. The surfaces of the titanium dioxide and/or titanium oxide hydrate coated mica particles are coated with from 1 to 7 pbw, to 100 pbw of the titanium dioxide and/or titanium oxide hydrate coated mica particles, of a silicon oxide and/or silicon oxide hydrate. The surfaces of the coated grains are further coated with from 0.5 to 5 pbw, to 100 pbw of the mica titanium dioxide and/or titanium oxide hydrate coated particles, of an aluminium oxide and/or aluminium oxide hydrate. The surfaces of the coated particles are further coated with from 0.5 to 3 pbw, to 100 pbw of the titanium dioxide and/or titanium oxide hydrate coated mica particles, of a zinc oxide and/or zinc oxide hydrate.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.625046

Item 291
Injection Moulding International
1, No.1, Nov./Dec.1996, p.38/40
INCORPORATING THE METALLIC LOOK INTO PLASTICS

The use of metallic pigments to achieve a metallic look for a plastic part is discussed. Aluminium pigments with a large particle size can result in brilliant shades. Metallic pigments can also be used for a variety of performance features. These include reflection of electromagnetic radiation, diffusion barrier, heat conductivity, electrical conductivity and microwave absorption. Tips are given on how to avoid flow and weld lines in the injection moulding process.

ECKART WERKE GMBH; OBRON ATLANTIC CORP.
EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; USA; WESTERN EUROPE

Accession no.624825

Item 292
European Plastics News
24, No.3, March 1997, p.50
PU GETS NEW CHOICE OF COLOURS

It is briefly reported that Milliken Chemicals has introduced four new Reactint colourants for use in flexible and non-flexible PUs. The new range includes a red, orange and two blacks. The colourants are polyols and do not interfere with the foam chemistry, which can be a problem with solid pigment dispersions.

MILLIKEN CHEMICAL CO.
USA

Accession no.624486

Item 293
Progress in Organic Coatings
29, Nos.1-4, Sept.-Dec.1996, p.39-43
SURFACE TREATMENT OF PIGMENTS. TREATMENT WITH INORGANIC MATERIALS
Bugnon P
Ciba-Geigy Ltd.

The role of the surface treatment of pigment particles in the pigment industry, especially in paint and ink applications, is discussed, together with the limitations of pigment derivatives with respect to bleeding and colouristics. New methods for treatment of pigments with inorganic materials are presented. It is shown that this type of colourless and insoluble treatment has a marked positive effect on the rheological behaviour of paints, without changing the other pigment properties. These treatments are shown to permit a broad modification of the surface characteristics of the pigment particles which lead to improved products. 14 refs. (21st International Conference in Organic Coatings Science and Technology, Athens, Greece, July 1995)

SWITZERLAND; WESTERN EUROPE

Accession no.623004

Item 294
Plastiques Modernes et Elastomeres
48, No.1, Jan./Feb.1996, p.28-31
French
COLOURING OF PLASTICS: SOME NEW IDEAS
Vasselle J B

A survey is made of developments in plastics pigments designed to replace cadmium and other heavy metals, and in compounding techniques for the colouring of plastics.

RHONE-POULENC SA; CIBA AG; BASF PEINTURES & ENCRES; DOW CHEMICAL CO.
EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; SWITZERLAND; USA; WESTERN EUROPE

Accession no.621164

Item 295
Revista de Plasticos Modernos
70, No.471, Sept.1995, p.261-5
Spanish

NEW PIGMENT RESULTING FROM BAYER RESEARCH: BAYERTITAN R-KB-5, AN IDEAL PRODUCT FOR PERFECT INDUSTRIAL AND AUTOMOTIVE FINISHES

The properties of Bayer's Bayertitan R-KB-5 organically treated rutile titanium dioxide pigment are examined, and results are presented of processability studies and investigations of the optical properties and weathering resistance of coating formulations pigmented with Bayertitan R-KB-5 in comparison with those of formulations containing chlorinated pigments.

BAYER AG

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.621124

Item 296

Informations Chimie

No.371, Sept.1995, p.69-76

French

PIGMENTS: TECHNOLOGY AND STYLE FOR PERFECT HARMONY

Savostianoff D; Leuenberger E

Markets for pigments and colourants in coatings, inks and plastics are examined. Developments by a number of companies are reviewed, and statistics are presented for the world pigments market.

WORLD

Accession no.621079

Item 297

Pitture e Vernici

72, No.12, Dec.1996, p.18-23

LEAD AND CHROMATE FREE ANTICORROSIVE PIGMENTS BASED ON PHOSPHATES

Krieg S

Heubach GmbH & Co.KG

Protection from corrosion is one of the important requirements for organic coatings. The corrosion control of metals by organic coatings using anticorrosive pigments has a long history and is forecast to have an even longer future. The protective action can be achieved either by a barrier effect or by an electrochemical or chemical influence. Inorganic anticorrosive pigments. Emphasis is placed on pigments known as active anticorrosive pigments. By use in organic coatings, these pigments are able to inhibit corrosion processes through chemical or electrochemical methods. This group includes the classic anticorrosive pigments such as red lead, zinc chromate and strontium chromate. Increasing awareness of environmental protection, reflected in national and international regulations, sets reduced limits for the use of these classic active pigments.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.618560

Item 298

Masterbatch '95. Conference proceedings.

Basel, 20th-22nd June 1995. Paper 21. 621

IMPROVED PIGMENT EFFECTIVENESS THROUGH ANALYSIS OF TWIN SCREW EXTRUDER PERFORMANCE

Toris J; Lea J

APV Baker

This paper describes some preliminary work aimed at characterising the influence that the colour concentrate compounding processs has on the dispersion and colour development in the final moulded article. A single colour concentrate formulation (containing two different pigment types; TiO2 and phthalocyanine green) was used, and compounded on three widely different sizes of compounder, all of which possess identical mixing geometry. The copolymer, styrene/acrylonitrile, was used as a finely ground material. The pigments were stearated and no processing aids included. The concentrate was let down using a single screw extruder, and then injection moulded plaques were analysed to determine pigment concentration and colour density. Significant effects of screw design, compounding conditions and extruder size were observed and explanations are proposed. 6 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.617642

Item 299

Plasticulture

No.107, 1995, p.50-6

English; French

USE OF PEARLESCENT PLASTICS TO INCREASE SPINACH PRODUCTIVITY

Arias G; Orona F; Ruiz V; Teran G E; Benavides A; Hernandez F; Cardenas J

Centro de Investigacion en Quimica Aplicada; Coahuila,Universidad Agricola

Blue, red and violet LDPE and linear LDPE films containing pearlescent pigments were evaluated in the protected cultivation of spinach. All the formulations studied increased carbon dioxide assimilation, but the yield was increased only by violet films. Higher pigment concentrations had a light stabilising effect on the films and increased the percentage reflectance. Linear LDPE formulations showed greater stability in artificial accelerated ageing trials and a higher percentage reflectance. 8 refs.

MEXICO

Accession no.616873

Item 300

Masterbatch '95. Conference proceedings.

Basel, 20th-22nd June 1995, Paper 9

IMPROVED PERFORMANCE OF ULTRAMARINE PIGMENTS IN PLASTICS

Davies F V
Holliday Pigments
(Applied Market Information)

New Ultramarine pigments developed by Holliday Pigments of the UK are discussed. The PREMIER range offer tight colour tolerances, low moisture pickup, improved dispersibility, reduction in extrudate strand blowing, reduction of melt-viscosity and significant reduction in odour. In addition, the introduction of the PRESTIGE range of low-dust pigments is briefly mentioned.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.616321

Item 301
Masterbatch '95. Conference proceedings.
Basel, 20th-22nd June 1995, Paper 7
NEW HEAVY-METAL FREE INORGANIC PIGMENTS
Fitoussi R
Rhone-Poulenc Chimie
(Applied Market Information)

This paper gives a brief overview of the main characteristics of cerium pigments. They present many properties similar to cadmium or lead based pigments in the orange and red hues; tint strength, hiding power, heat stability, ease of dispersion, resistance to migration, and no indication of warping. Their weatherability is even better. Finally, they can be used in different polymers(they are not resin-specific). All these qualities, added to their environmental friendliness, make cerium pigments one of the most promising candidates for replacing heavy metal pigments and explain why Rhone-Poulenc are moving towards a pilot-scale production phase. A pre-industrial unit, which is under construction will be operational by the end of 1995.

EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; WESTERN EUROPE

Accession no.616319

Item 302
Masterbatch '95. Conference proceedings.
Basel, 20th-22nd June 1995. Paper 5
DEVELOPMENTS IN ORGANIC PIGMENTS FOR TRANSPARENT POLYPROPYLENE
Jandke J
CIBA-GEIGY Ltd.
(Applied Market Information)

The increasing trend towards using transparent polypropylene has led to new requirements for the colourants. At present, these requirements e.g. very high transparency, excellent fastness and resistance properties, high colour-strength, good dispersibility and attractive colour shade, cannot be met by existing pigments and dyes. This paper demonstrates that considerable progress could be made by adopting new approaches to pigment chemistry and technology, viz (a) solid solutions (e.g. CINQUASIA Red RT-280-D which is a solid solution of a Diketo-pyrrolo-pyrrole (DPP) pigment and a Quinacridone pigment), (b) development of new chemical structures related to DPP (e.g. Pigment Orange 71 and Pigment Red 264), and (c) compatibility enhancement (e.g. Pigment Yellow 199 - a unique pigment based on an anthraquinone chromophore). Data are presented which show that these attractive pigments, which range from bluish -red to yellow, exhibit very high transparency combined with outstanding fastness properties and good processability, thus making them ideal colourants for transparent polyolefins.

SWITZERLAND; WESTERN EUROPE

Accession no.616317

Item 303
Masterbatch '95. Conference proceedings.
Basel, 20th-22nd June 1995, Paper 3
A SHORT UPDATE ON THE ENVIRONMENTAL, HEALTH AND SAFETY REGULATIONS IN THE EUROPEAN UNION
Mislin R
Sandoz Chemicals Ltd.
(Applied Market Information)

Five new European directives and an ordinance in Germany which may influence the activities of the chemical industry and, particularly, the components entering the composition of masterbatches (e.g. pigments, colourants, additives) are briefly discussed. Directives relate to issues such as; risk assessment, control of existing chemicals, replacement of cadmium based pigments by organic pigments and prohibition of polybrominated biphenyls and certain azo dyestuffs.

EU; EUROPEAN COMMUNITY; EUROPEAN UNION; SWITZERLAND; WESTERN EUROPE; WESTERN EUROPE-GENERAL

Accession no.616315

Item 304
Modern Plastics International
26, No.12, Dec.1996, p.114
QUINACRIDONE PIGMENT

Quinacridone pigment, PV Fast Pink E VP 2169 from Hoechst, is for colouring PVC and polyolefin cable sheathing and engineering plastics, as well as PP, PETP and nylon 6 spin dyeing. The company claims a first for colouring of thin-walled items and fibres with CI pigment Red 122 in masterbatch form. The pigment is heat stable up to 300C and has a lightfastness value of 7 to 8 at 68.8% purity and standard depth 1/3 of 9.30g/kg. Acid resistance is rated at 5. This abstract includes all the information contained in the original article.

HOECHST AG

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.615884

Item 305
Plastics World
54, No.11, Nov.1996, p.64
TAKING THE STRESS OUT OF THE PROCESS

It is briefly reported that Teknor Colour has developed a new processing system so that a customer can provide holographic glitter for use in calendered PVC film. The holographic glitter is coated with an epoxy, but the initial mixing process applies a shear stress which causes the coating to delaminate and cloud the substrate. The solution was to encapsulate the glitter in transparent PVC pellets that are let down in compounded material, heated and calendered into film.

TEKNOR COLOR CO.
USA

Accession no.614636

Item 306
Plastics and Rubber Weekly
No.1662, 15th Nov.1996, p.7
NEW PIGMENTS HIT THE MARKET

It is briefly reported that Ciba Pigments has brought onstream new pigments for the plastics industry based on its diketopyrollopyrole chemistry. Chromophtal DPP Flame Red FP has been developed to provide attractive bright red shades in vinyl, polyolefin and styrenic polymers. Tioxide has announced it has won approval for its new pigment Tioxide TR27 from Transcolor. It is claimed the pigment reduces die build-up and lacing at high temperatures.

CIBA PIGMENTS; TIOXIDE GROUP PLC
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.614582

Item 307
Plastics Formulating & Compounding
2, No.4, July/Aug.1996, p.31/51
RIGHTFITTING
Valin R
Engelhard Corp.

It is explained that many pigments used in plastics have higher performance properties than are actually called for, meaning that the formulator may have to pay a premium price for performance he does not need. Rightfitting is an approach to product development that aims to correct this by more closely matching pigment attributes to end-use requirements. This article discusses rightfitting in detail.

USA

Accession no.614483

Item 308
Injection Molding
4, No.11, Nov.1996, p.152-3
HOW TO FIX COLOUR STREAKING AND REDUCE CYCLE AT SAME TIME
Sloan J

Custom moulder Sun Plastics had experienced a colouring problem, and had been awarded a contract to mould red PP medical waste bins with a quoted cycle time of 18 seconds. The problem was that the red colourant required a cycle time of 22 seconds to properly mix the melt, or the bins were red streaked, not solid red. An attempt was made to install a dispersion disk and a mixing nozzle, to no avail. Sun could not reduce the cycle time to below 22 seconds. To solve the problem, the company turned to Koch Engineering and the KMH mixing head series. Sun installed the mixer on the 375-ton press. The company reports that part improvement and colour uniformity were immediate. In a week, the average cycle time was reduced to 18.5 seconds and machine efficiency increased from 87% to more than 95%. Details are given.

SUN PLASTICS INC.; KOCH ENGINEERING CO.
USA

Accession no.614298

Item 309
European Plastics News
23, No.10, Nov.1996, p.45-6
CATCHING UP ON COLOUR

Hoechst Pigments claims that a move towards PETP and PP from PVC in the packaging market is leading to a demand for pigments with high heat resistance and use of dyestuffs. One of the newer material developments has been thermochromic colours which change with temperature. At Masterbatch 96, the allegations concerning links between carbon black and cancer were discussed. Prayon-Rupel claims to be the first to develop a continuous process to make ultramarine blue. The company's new facility will be on stream by the end of this year.

WESTERN EUROPE-GENERAL

Accession no.610584

Item 310
Kunststoffe Plast Europe
86, No.9, Sept.1996, p.27-8
COST REDUCTION BY METALLIC PIGMENTS
Klein B; Bunge H H
Eckart-Werke; Obron Atlantic Corp.

Advantages are discussed of the use of metallic pigments in plastic parts as a cost reducing alternative to galvanising or coating. Modified, easy-to-handle metallic pigments are demonstrated to eliminate some of the production problems often associated with these pigments in plastic parts, together with performance advantages and the ability to eliminate flow and weld lines.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; USA; WESTERN EUROPE

Accession no.610546

Item 311
Antec '96. Volume III. Conference proceedings. Indianapolis, 5th-10th May 1996, p.2672-4.
NEW EFFECTS USING PEARLESCENT PIGMENTS
Dyer K D
Mearl Corp.
(SPE)

Pearlescent pigments are used to produce new effects in both transparent and opaque polymers. The effects produced by the transparent polymers are quite different from those produced using opaque polymers. In transparent polymers it is possible to observe both reflection and transmission colour of the pearlescent pigment, while in opaque polymers the pearlescent pigment's contribution is limited to reflection from pigment platelets near the surface of the resin. For transparent polymers, pearlescent pigments add a natural appearance. This effect is created using only about 20% of the pearlescent pigment that was used previously to create pearlescent effects. For opaque polymers with added dark colourants, pearlescent pigments add a richness and brightness to the appearance. More pearlescent pigment is required in opaque polymers to obtain this effect.

USA

Accession no.609017

Item 312
Modern Plastics International
26, No.11, Nov.1996, p.54-9
MOULDERS CONFRONT CHALLENGES OF AT-THE-PRESS COLOURING
Snyder M R

As the practice of introducing colourants at the press becomes more widespread, injection moulders are more able to solve colour problems, frequently in close working relationships with suppliers of colourants, feeding equipment and mixing screws. Examples of recent case histories are given to illustrate how problems were resolved. These include streaking in orange recreational vehicle fenders moulded in HDPE, and problems with unmelted particles and inadequate colour dispersion in a PP part.

USA

Accession no.608961

Item 313
Modern Plastics International
26, No.10, Oct.1996, p.140
BISMUTH VANADATE

It is briefly reported that Lightfast Yellow, Trial Product AI 5370, yields a brilliant colour with greenish undertones in polyolefins and injection moulded nylons. Bayer says light fastness and weatherability make the product suitable for use in objects placed outdoors such as crates and dustbins. The pigment is treated with a zinc compound to improve thermal stability and is microgranulated for free flow and metering facility with low dust.

BAYER AG

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.607716

Item 314
Stoke-on-Trent, c.1995, pp.2. 12ins. 2/10/95.
ZINC OXIDE
Brown J.M.,Ltd.

Specifications, properties and material safety data are presented for zinc oxide from James M.Brown Ltd. The product is made by both the indirect (French) way and the direct (American) process, enabling the company to offer a full range of qualities from pharmaceutical to silver seal grade.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.604224

Item 315
Stoke-on-Trent, c.1995, pp.2 (folded). 9 ins. 2/10/95.
CADMIUM PIGMENTS COLOUR CARD
Brown J.M.,Ltd.

The range of cadmium colours from James M.Brown is described. It is continuous from pale primrose to golden and red to maroon, and is variable in respect of the tinting strength available. The pigments meet all the current international requirements, meeting the limits for acid-soluble heavy metals in food contact plastics use. Colour samples are given, and typical applications in paints, rubber, plastic are indicated. Chemical and physical limits and product characteristics are detailed.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.604215

Item 316
Patent Number: US 5480482 A 19960102
REVERSIBLE THERMOCHROMIC PIGMENTS
Novinson T
US,Navy

A pigment composition which changes colour reversibly when heated comprises a cyclic aryl lactone dye, a diaminoalkane activator and an ester. The pigment composition can also include a white pigment such as titanium dioxide as an opacifier or a yellow die such as Hansa yellow G. The pigment composition changes from a dark colour, e.g. blue, to white when the composition is heated to a specified temperature, e.g. to a temperature of 52C, and reversibly changes from white back to the blue colour when the pigment composition is cooled, e.g. to a temperature below about 25C.

USA

Accession no.604133

Item 317
Modern Plastics International
26, No.9, Sept.1996, p.94-6
COLOURANTS

An outline of the latest colourant grades and their properties is presented. These include pearlescents, multifunctional concentrates, increased colour range for PUR, photoluminescents and additives that enhance laser marking.

WORLD

Accession no.604052

Item 318
Kunststoffe Plast Europe
86, 7, July 1996, p.14-8
COLOURANTS
Leissler K; Roesch G
BASF Lacke & Farben AG; BASF AG

A review is presented of colourants with specific details relating to dyestuffs, inorganic and organic pigments. A survey is included of the most widely used in each of these categories with details of shade range, chemical class, colour index number, temperature resistance in HDPE, and trade name. 2 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.603907

Item 319
Plastics in Canada
3, No.2, April/May 1996, p.67
PIGMENTS: SOLVING THE HEAT DEGRADATION PROBLEM

Heat stability is still an issue in pigments for plastics. As heavy metals-based pigments are reduced, and organics take over, residence time and heat degradation are problems that have been addressed, but not wholly solved. Registration of new chemistries under the Canadian Environmental Protection Act is still an issue. A widespread complaint is that the cost of bringing new chemistries to market is high to begin with. Add to that the cost of getting specific Canadian approval in what is a relatively small market, and the palette available to the compounder or colour consultant is certainly adequate, but less than a European or Asian company might have. The US market has seen the change from lead and cadmium-based pigments faster than Canada has done, according to BASF Canada. Regulatory pressure was heavier, but the larger market also meant that approvals costs could be spread over a broader market. Details are given.

BAYER CANADA INC.; ENGELHARD CORP.; QUEBEC PIGMENTS INC.

CANADA

Accession no.603211

Item 320
Plastics and Rubber Weekly
No.1650, 23rd Aug.1996, p.8
NEMOTO GLOW

It is briefly reported that Nemoto of Japan is highlighting the potential of its new Luminova phosphorescent pigments, which offer afterglow and light fastness up to 10 times that of existing systems. As well as making inroads in the zinc sulphide market, the company believes its patented technology will create many new outdoor applications for luminescent pigments. Luminova, which is based on strontium aluminate doped with Rare Earth elements, is stated to be compatible with acrylic, polyester, epoxy, PVC, PP and PE.

NEMOTO

JAPAN

Accession no.599502

Item 321
Pitture e Vernici
72, No.5, May 1996, p.26-7
Italian; English
MICA PIGMENTS IN POWDER COATINGS
Harris S

The nature and uses of mica pigments in powder coatings are examined. The various types of mica pigments are described and their ability to produce pearlescent, lustrous, brilliant, and chromatic effects. Methods of incorporation of the pigments are discussed, the simplest being by dry blending. Lustre pigment can be incorporated by means of the bonding process which is effectively used to bond aluminium flake pigments. Benefits of Merck's range of surface modified pigments are also reported.

MERCK LTD.,PIGMENTS DIV.

EUROPEAN COMMUNITY; EUROPEAN UNION; ITALY; WESTERN EUROPE

Accession no.594174

Item 322
Plastics Technology
42, No.5, May 1996, p.48/54
COLOUR FORMULATOR'S SELECTION GUIDE. BEST MATCHES FOR HEAVY-METAL PIGMENTS
Sherman L M

The changeover from heavy metal inorganic pigments to more environmentally friendly substitutes is discussed, and factors to be borne in mind regarding the formulation when such changes are made. Tables of substitutions for the various colour pigments traditionally met by cadmium, lead chromate, and lead molybdate are presented, with details of the shade to be replaced, the supplier, product, lightfast rating, maximum processing temperature, recommended resins for use with, and supplier's comments.

USA

Accession no.591081

Item 323
Polymer Engineering and Science
36, No.7, Mid-April 1996, p.1010-8
EFFECT OF COLOURANTS ON THE PROPERTIES OF ROTOMOULDED POLYETHYLENE PARTS
Nagy T; White J L
Akron,University

An experimental study is reported on the effect of colourants on the warpage, shrinkage, and mechanical properties of rotomoulded PE parts. Five pigments were investigated (titanium dioxide white, cadmium oxide yellow, iron oxide red, carbon black and phthalocyanine blue). Their concentration ranged from 0.11 to 0.36 wt%. The pigments were added to LLDPE by various techniques, dry blended in low intensity or high intensity mixer or compounded with a single-screw extruder. Some blends also contained 0.077 wt% zinc stearate as surfactant. 18 refs.

USA

Accession no.590710

Item 324
Kunststoffe Plast Europe
86, No.4, April 1996, p.23-5
BISMUTH VANADATE PIGMENTS - AN ALTERNATIVE TO LEAD AND CADMIUM-CONTAINING PLASTICS PIGMENTATIONS
Endriss H; haid M
BASF AG

Thermally-stable bismuth vanadate pigments, as a result of their brilliant yellow colour and good weathering resistance, are shown to be usable to replace lead and cadmium pigments in the colouring of plastics materials. Because of the low toxicity of bismuth vanadate pigments, the products, which are usually supplied as low-dust or even dust-free preparations, may be processed without specific industrial hygiene measures. These pigments create no problems with regard to the disposal and recycling of coloured plastics. (Translated from Kunststoffe, 86, No.4, April 1996, p.538-40)

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.590067

Item 325
Modern Plastics International
26, No.5, May 1996, p.122
INORGANIC YELLOW PIGMENT

Lightfast Yellow 62 R from Bayer is a mixed-phase chrome rutile pigment with niobium instead of antimony incorporated into the lattice. The pigment has 35% higher tinting strength, 20% better hiding power and improved gloss promotion compared to Lightfast Yellow 6 R from the same supplier. Applications include weather- and heat-stable pigmentation. The product satisfies food-contact plastics requirements for pigments. The pigment was market tested as Trial Product PK 5362.

BAYER AG

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.589730

Item 326
Paint & Ink International
9, No.1, Jan./Feb.1996, p.22-3
SYNTHETIC VERSUS NATURAL MICACEOUS IRON OXIDE AS AN ANTI-CORROSIVE PIGMENT

Over the years, micaceous iron oxide has proved that it has superior anti-corrosive properties compared with many traditional anti-corrosive pigments. Consequently, MIO has become an important constituent of specialised paints and heavy duty coatings for protecting structural steel work from corrosion. MIO's anti-corrosive ability stems from its flaky particle structure. These flaky particles, when incorporated into a suitable binder system, will overlap to form tightly packed layers which lie parallel to the substrate. This arrangement creates a barrier, making it difficult for the corrosive particles to penetrate the pigment. Omya Croxton & Garry supplies both natural and synthetic MIO. The products are manufactured at the Laminox plant at Peterlee, Co Durham. Two grades of synthetic MIO are produced, Laminox S and Laminox F.

CROXTON & GARRY LTD.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.584538

Item 327
Polymer Additives for Injection Moulding and Extrusion Applications. Retec proceedings.
White Haven, Pa., 18th-19th Oct.1995, p.189-204. 5
PRIMER ON COLOURFUL ADDITIVES
Harris R M
Hanna M.A.,Co.
(SPE,Lehigh Valley Section; SPE,Polymer Modifiers & Additives Div.)

It is claimed that the melt colouring of plastics is one of the most functional value added features a resin producer, compounder, or part fabricator can impart to their products. It not only provides desired appearance properties that help sell the product, but it can also enhance several other properties, such as UV stability. In addition, melt colouring usually eliminates the need for a separate, off-line, painting step. Overall manufacturing costs can thereby be reduced. An attempt is made to raise the level of awareness that colour needs to be part of any total systems approach to material design. The major classes of colourants suitable for use in high performance polymer blends and alloys are

surveyed, and some potential chemical and physical colourant/material interactions described.

USA

Accession no.584089

Item 328
Revue Generale des Caoutchoucs et Plastiques
No.738, Feb.1995, p.68-72
French
GOLDEN FUTURE FOR PEARLESCENT PIGMENTS
Gautier J P; Paire E
Laboratoires Merck-Clevenot

An examination is made of the properties of Iriodine pearl effect pigments (Merck), consisting of mica coated with metal oxides, and of their use in the colouring of plastics.

MERCK
EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; USA; WESTERN EUROPE

Accession no.583137

Item 329
Revue Generale des Caoutchoucs et Plastiques
No.738, Feb.1995, p.60-5
French
PLASTICS HOIST THE COLOURS
Forest J P

A survey is made of types of pigments and colourants used for colouring plastics, and developments by a number of companies are reviewed. The principal methods of colouring are described, and European legislation relating to the use of pigments and colourants in food packaging and toys is examined. 2 refs.

CIBA-GEIGY AG; HOECHST AG; MELCOPLAST; TIOXIDE GROUP PLC; SYNTHECOLOR; SNCI; FERRO CORP.; BAULE M.,SA
BELGIUM; EUROPEAN COMMUNITY; EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; GERMANY; ITALY; NETHERLANDS; SWITZERLAND; UK; USA; WESTERN EUROPE-GENERAL; WESTERN EUROPE

Accession no.583135

Item 330
Plastiques Modernes et Elastomeres
46, No.10, Dec.1994, p.42-4
French
HIGH COLOUR PLASTICS
Topuz B

Methods for the colouring of plastics are reviewed, and the relative advantages of powders, masterbatches and liquid colourants are examined. Developments in special effect and cadmium-free pigments are also discussed. Reference is made to materials produced by a number of companies.

BASF AG; 2R COULEUR; SYNTHECOLOR; ELIAN; CABOT PLASTICS INTERNATIONAL; WILSON COLOR SA; SODIREP; SNCI; SILBERLINE LTD.; EMACOLOR SA; MERCK; FRANCE LASER
EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; GERMANY; UK; USA; WESTERN EUROPE; WORLD

Accession no.583064

Item 331
European Plastics News
23, No.3, March 1996, p.47
BAYER ADDS INORGANIC PIGMENTS

Bayer AG has extended its range of inorganic pigments with its Lightfast Yellow 62 R. This mixed-phase rutile pigment is different from conventional ones, it is claimed, because of its higher tinting strength, better hiding power and gloss promotion. It is suitable for light-fast, weather-stable and heat-stable pigmentation of plastics and coatings, and meets the purity requirements for pigments used in food-contact applications. This abstract includes all the information contained in the original article.

BAYER AG
EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.582362

Item 332
Asian Plastics News
Jan/Feb.1996, p.18
COLOURFUL IDEAS

New pigment technologies were discussed in papers presented at the Masterbatch ’95 conference, and are reviewed here. Developments included new cerium-based chemicals as alternatives to lead, chromium and cadmium from Rhone-Poulenc, the Premier range of ultramarines from Holiday Pigments, and Ciba’s research into polymer-soluble dyes for transparent PP.

SWITZERLAND; WESTERN EUROPE

Accession no.579536

Item 333
European Plastics News
23, No.1, Jan.1996, p.40
PIGMENTS PROMISE BRILLIANCE

Mearl has introduced two grades of its Mearlin Dynacolor series of lustre pigments, which offer lustre and brilliance coupled with enhanced chroma. Dynacolor GG and BB consist of an absorption colourant deposited directly on a titanium dioxide-coated mica interference pigment. For GG, a green colourant is deposited on a green pigment. At the specular angle the interference green is seen and at the off-angle the absorption colour is seen, enhancing the colour. The same is true for the blue BB colour. This abstract includes all the information contained in the original article.

MEARL CORP.
USA

Accession no.578109

Item 334
Antec 95. Volume III. Conference proceedings.
Boston, Ma., 7th-11th May 1995, p.3269-73. 012
MAXIMISATION OF PEARLESCENT PIGMENT IN MASTERBATCHES AND EFFECTS ON MECHANICAL PROPERTIES
Brickley J
Behrend College
(SPE)

Pearlescent masterbatches are typically formulated with a 20-25% loading of pigment. When this percentage is increased problems arise with dispersion of the pigment which leads to erratic colour and quality of the masterbatch. The problems associated with compounding at higher levels of pearlescent pigment in the masterbatch are examined. Finally, the effects that pearlescent pigments have on mechanical properties at various pigment loadings in the final moulded part are described.
USA

Accession no.577452

Item 335
European Plastics News
22, No.11, Dec.1995, p.28-9
COLOURFUL IDEAS

Ciba has outlined the company's research into polymer-soluble dyes for transparent PP. The company has developed a number of solid solutions. These are made of two components which either crystallise together to form a new single interpenetrating crystal structure or one of the components crystallises into the crystal structure of the other. Rhone-Poulenc has developed a number of new pigments based around cerium sulphide. This additive is said to have good thermal stability, lightfastness, opacity, tint strength and dispersibility. Holliday Pigments' new Premier D grades of ultramarine blue have all the surface moisture removed and also part of the lattice moisture.

CIBA PIGMENTS; RHONE-POULENC SA; HOLLIDAY PIGMENTS INTERNATIONAL
WESTERN EUROPE-GENERAL; WESTERN EUROPE

Accession no.576421

Item 336
Color and Appearance Retec: Effects in Plastics. Conference proceedings.
Oak Brook, Il., 20th-22nd Sept.1994, p.231-5. 52
ENHANCEMENT OF LASER MARKING PLASTIC POLYMERS WITH PEARLESCENT PIGMENTS
Babich J D; Edler G
EM Industries Inc.; Merck E.,KG
(SPE,Color & Appearance Div.; SPE,Chicago Section)

Information is presented which is essential for the laser marking of plastics. The laser marking process and the advantages of operating a laser compared with traditional methods are discussed. The required equipment and pigment additives necessary to successfully mark plastics with lasers are presented with samples demonstrating the effectiveness of each. Some emphasis is placed on the marking of plastics materials compounded with pearlescent pigments. 5 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; USA; WESTERN EUROPE

Accession no.576102

Item 337
Color and Appearance Retec: Effects in Plastics. Conference proceedings.
Oak Brook, Il., 20th-22nd Sept.1994, p.176-83. 52
CONTROLLING METALLIC AND PEARLESCENT COLOURS WITH AN 8 DEG. INTEGRATING SPHERE SPECTROPHOTOMETER AND EXISTING COLOUR FORMULATION SOFTWARE
Mueller J S
Datacolor International
(SPE,Color & Appearance Div.; SPE,Chicago Section)

The use of special effects pigments for all types of commercial products is growing rapidly. Pearl and metallic flake colourants today add depth and lustre to an increasingly wide variety of consumer products, from cosmetics packaging to automotive trim. The appeal of these pigments lies in their richness and variability. A conventional diffuse eight degree integrating sphere spectrophotometer can successfully be used to control special effects colours in production. Aspects covered include single-angle vs. multi-angle measurements, preparing the colourant data file and procedures for controlling production colours.

USA

Accession no.576097

Item 338
Color and Appearance Retec: Effects in Plastics. Conference proceedings.
Oak Brook, Il., 20th-22nd Sept.1994, p.165-75. 52
COLOUR STYLING WITH GENUINE METALLICS IN PLASTICS
Bunge H
Obron Atlantic Corp.
(SPE,Color & Appearance Div.; SPE,Chicago Section)

Aluminium and bronze pigments offer a wide range of unique colouristic effects, which are described in relation to their different optical characteristics. In the past, the chemical resistance of metallic pigments have always been a problem. During the past few years, various modified versions of both aluminium as well as bronze pigments have been developed which open new areas for their application in plastics. Their characteristics and advantages are discussed, together with how best to

incorporate metallic pigments into the different plastic resins. 4 refs.

USA

Accession no.576096

Item 339
Color and Appearance Retec: Effects in Plastics.
Conference proceedings.
Oak Brook, Il., 20th-22nd Sept.1994, p.148-60. 52

PRELIMINARY STUDIES OF IMPROVED DISPERSING AIDS FOR FLUORESCENT PIGMENTS IN POLYOLEFIN PLASTICS

Hyche K W; Hollis R D
Eastman Chemical Co.
(SPE,Color & Appearance Div.; SPE,Chicago Section)

Many fluorescent pigments used to colour thermoplastics are difficult to disperse and sometimes cause plate-out problems during compounding and processing. Through the use of selective dispersing aids, such fluorescent carrier can be compounded so that the carrier polymer is compatible with the plastic to be coloured. Several polymeric dispersing aids are described which will enhance pigment dispersion, allow higher pigment loadings, compatibilise several pigment carrier/plastic combinations and prevent plate-out during processing. 4 refs.

USA

Accession no.576094

Item 340
Color and Appearance Retec: Effects in Plastics.
Conference proceedings.
Oak Brook, Il., 20th-22nd Sept.1994, p.125-36. 52

PHOTOCHROMIC DYES: HOW LONG DO THEY LAST?

Malatesta V
Great Lakes Chemical Italia srl
(SPE,Color & Appearance Div.; SPE,Chicago Section)

Organic photochromes are among the most interesting of functional dyes. Many potential applications have been envisaged in fields including recording, display and copying materials (optical discs or dry non-silver photography), special papers and gadgets, and sun and prescription lenses. The durability of the two classes of photochromes is limited due to photodegradation that takes place after a number of dark-light cycles. Results of testing are presented. 16 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; ITALY; WESTERN EUROPE

Accession no.576091

Item 341
Color and Appearance Retec: Effects in Plastics.
Conference proceedings.
Oak Brook, Il., 20th-22nd Sept.1994, p.115-24. 52

SPECIFYING SPECIALITY COLOURS USING THE PANTONE PLASTICS COLOUR SYSTEM

Marcus R T; Trapp G
Pantone Inc.; International Color Standards
(SPE,Color & Appearance Div.; SPE,Chicago Section)

The Pantone Plastics Color System was developed for the plastics industry to provide a practical means of selecting, specifying and controlling colour. This comprehensive systems consists of 2,820 injection moulded chips in 1,965 opaque and 855 transparent colours. Although the colours in the system are organised in an orderly arrangement, no attempt has been made to organise them scientifically or to develop a colour order system. Aspects covered include organisation of the opaque basic colours and the transparent basic colours, the opaque and the transparent speciality colours, specifying additional pearlescent and fluorescent colours and examples of specifying speciality colours.

USA

Accession no.576090

Item 342
Color and Appearance Retec: Effects in Plastics.
Conference proceedings.
Oak Brook, Il., 20th-22nd Sept.1994, p.87-93. 52

IMPROVING THE PROCESSABILITY OF FLUORESCENT PIGMENTS

Heyl D A
Day-Glo Color Corp.
(SPE,Color & Appearance Div.; SPE,Chicago Section)

Fluorescent pigments for plastic applications are reported to have presented a variety of processing challenges in the plastics industry. One such problem encountered by the end user is plate-out. An attempt is made to define, determine the cause of and minimise the impact of plate-out associated with fluorescent pigments, in order to improve their processability. Results of injection mould and blown pin plate-out tests are presented. 4 refs.

USA

Accession no.576087

Item 343
Color and Appearance Retec: Effects in Plastics.
Conference proceedings.
Oak Brook, Il., 20th-22nd Sept.1994, p.79-86. 52

EFFECT OF PARTICLE SIZE, ILLUMINATION AND OBSERVATION OF LUSTRE PIGMENTS

Teaney S
EM Industries Inc.
(SPE,Color & Appearance Div.; SPE,Chicago Section)

Styling of colours and their perception by observers are among the most fundamental arts associated with decorative design. The appearance of samples prepared with pure absorption pigments is scarcely affected by direction of illumination and observation. However, today's colourants are reported to use sophisticated effect

pigments, pearlescent and/or metallic flakes which display unique colour characteristics. The appearance of the object will show large variations in colour and lustre depending on particle size, illumination and observation angles.

USA

Accession no.576086

Item 344
Color and Appearance Retec: Effects in Plastics.
Conference proceedings.
Oak Brook, Il., 20th-22nd Sept.1994, p.33-57. 52
THREE COLOUR EFFECTS FROM INTERFERENCE PIGMENTS
Armanini L
Mearl Corp.
(SPE,Color & Appearance Div.; SPE,Chicago Section)

Pearlescent and interference pigments are used extensively in a wide range of applications, including their incorporation in plastics, coatings, printing inks, cosmetics and automotive paints. Although pearlescent pigments encompass the natural essence derived from fish and also the various crystal forms of bismuth oxychloride, it is the coatings of titanium dioxide and iron oxide on mica that have gained the most acceptance. Details are given of the former and their derivatives. The optical properties of pearlescent and interference pigments are examined and compared to absorption colourants. 4 refs.

USA

Accession no.576083

Item 345
Color and Appearance Retec: Effects in Plastics.
Conference proceedings.
Oak Brook, Il., 20th-22nd Sept.1994, p.18-22. 52
FLUORESCENT PIGMENTS AS PLASTIC COLOURANTS: AN OVERVIEW
Bianchi D D
Radiant Corp.
(SPE,Color & Appearance Div.; SPE,Chicago Section)

Fluorescence is a process of photoluminescence by which light of short wavelengths, either in the UV or the visible regions of the electromagnetic spectrum, is absorbed and reradiated at longer wavelengths. The re-emission occurs within the visible region of the spectrum and consequently is manifested as colour. Fluorescent pigments are often used in specific applications where a particular appeal is required. Aspects considered include the nature of fluorescent pigments, manufacturing processes, environmental considerations, quality control, incorporation into plastics and processing challenges.

USA

Accession no.576081

Item 346
Modern Plastics International
25, No.12, Dec.1995, p.94
LOW MOISTURE ULTRAMARINES

Low moisture ultramarines in the Premier D range from Holliday Pigments are briefly described. They are claimed to eliminate blowing effects associated with moisture levels, and are also odourless, thereby providing a better working environment.

HOLLIDAY PIGMENTS LTD.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.574745

Item 347
Leverkusen, 1995, pp.10 . 12ins. 19/5/95.
Tech.Inf.Bull.No.3.5.1. Order No.A114858. 52P11
USE OF BAYER INORGANIC PIGMENTS IN THE SUBSTITUTION OF LEAD PIGMENTS
Bayer AG,Inorganics Business Group

The range of inorganic colour pigments from Bayer is described, with reference to their use as substitutes for lead pigments, following concerns of toxicity. Bayer's pigments are suitable for use as base pigments for the substitution of lead pigments in reds, yellows and greens. Their colouristic potential is discussed, along with optical properties and costs.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.574723

Item 348
European Coatings Journal
No.12, 1995, p.942-3
FINAL MEETING
Nowak J

A review is presented of new products presented at the Resins & Pigments trade show, held in Brussels, Nov.14-6, 1995. Brief descriptions of given of new pigments and resins available from a wide variety of producers, with details of special features, properties and typical applications for each.

BELGIUM; EUROPEAN COMMUNITY; EUROPEAN UNION; WESTERN EUROPE

Accession no.572273

Item 349
Patent Number: WO 9511279 A1 19950427
POLYMERISABLE YELLOW DYES AND THEIR USE IN OPHTHALMIC LENSES
Jinkerson D L
Alcon Laboratories Inc.

These dyes are used to block or lower the intensity of blue light transmitted through ocular lenses and other windows.

USA

Accession no.568954

Item 350
Chemical Marketing Reporter
248, No.14, 2nd Oct.1995, p.SR22
PIGMENTS LOOK BRIGHT
Shearer B

The outlook for pigments over the next year looks good as long as the general economy continues its recent upswing. Titanium dioxide and carbon black have posted particularly strong performances for most of this year. On a worldwide basis, titanium dioxide is a 3.5 billion ton market and carbon black is a 5 million ton business. Assuming the world market continues to grow at around 3-5%/year, titanium dioxide supply will continue to be tight. Industry players plan to add approximately 580,000 metric tons of the pigment in the next two or three years. In the carbon black market, Witco will sell the assets of its Continental Carbon Company to China Synthetic Rubber, while J.M. Huber has signed a letter of intent to sell its Gulf Coast plants to Gantrade.

WORLD

Accession no.563879

Item 351
Modern Plastics International
25, No.10, Oct.1995, p.67
ELIMINATING HEAVY METALS EXACTS A HEAVY PRICE
Leaversuch R D

The transition from cadmium, lead and chromium-based pigments is exacting penalties ranging from rocketing colouring costs to diminished colour expectations. Industry sources estimate that pigments costs are up 300% in the past two years. Moulded HDPE packagers have moved from bright colours to blacks and greys to avoid heavy metals. Special effect pigments meet the marketing needs of customers who once held bright colours indispensible. Colourants spawned by a new organic chemistry patented by Ciba-Geigy are being trialled by Teknor Color Co. Diketopyrrolopyrrol products are thermally stable to 287C and hike opacity, light stability and brightness. Ferro Corp. has replaced virtually all heavy metals for nylon 66.

WORLD

Accession no.563810

Item 352
Property Enhancement with Modifiers and Additives. Retec proceedings.
New Brunswick, N.J., 18th-19th Oct.1994, p.135-54. 5
STABILISATION OF DARK PIGMENTED WEATHERABLE RIGID PVC
Walter S
Akcros Chemicals
(SPE,Palisades Section; SPE,Polymer Modifiers & Additives Div.)

The use of dark pigmented rigid PVC for weatherable type applications is well known. Numerous challenges have been encountered in the commercialisation of dark brown PVC windows, including poor heat distortion characteristics, loss of strength during weathering, colour fading, etc. The results of work carried out to improve the colour stability of dark brown pigmented rigid PVC during weathering are presented. The investigation concentrates on the effect of the stabiliser type and use level, and the effect of an ancillary organic UV light stabiliser package. Comparisons are carried out in two outdoor weathering programmes with samples exposed in Arizona, Florida and New Brunswick.

USA

Accession no.563476

Item 353
Polymers Paint Colour Journal
185, No.4370, Aug.1995, p.24-5
THE HOW AND WHY OF LUMINESCENT PIGMENTS
Martindell M
Glowbug

An interview with Mike Martindell, general manager of Glowbug is reported in which the use of phosphorescent and fluorescent pigments in coatings is discussed, and the differences between the two types of pigment are explained.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.561993

Item 354
Canadian Plastics
53, No.6, Aug.1995, p.25/8
SPECIAL EFFECTS MATURE
Turriff C

Trends in special effect colourants are reviewed as manufacturers demand high quality products with which to give their products a marketing edge. Efforts to reduce the use of heavy metals are reported, especially in the pearlescent colour range. Higher levels of carbon black are being requested by compounders in colour concentrates, so that the amount of carrier resin is reduced, which in turn increases the concentration of the base resin and the performance of the end product. This trend to higher concentrations is also evident in titanium dioxide masterbatches. New product developments are described.

CANADA

Accession no.561974

Item 355
New Materials/Japan
Sept.1995, p.7
FLUORESCENT PIGMENTS AID AGRICULTURAL FILM

It is briefly reported that Nippon Soda has developed fluorescent pigments based on pyrazine compounds which look set to find prominent use in plastics films used in agriculture due to their ability to drastically change the wavelength of sunlight. When added to plastic film the pigments turn UV and visible rays into blue and red light, respectively, thereby promoting photosynthesis of agricultural crops. Tests have confirmed that the products help increase yields, improve crop quality and control harvest times.

NIPPON SODA CO.LTD.
JAPAN

Accession no.560745

Item 356
Plastics and Rubber Weekly
No.1599, 18th Aug.1995, p.21
POSITIVE ON LEAD

It is briefly reported that lead chromate pigments are still widely used in the plastics industry, despite the alleged environmental issues associated with them, according to Lead Chrome Colours. The company says that in commercial terms they offer excellent value for money, coupling superior light fastness, thermal stability, brightness and opacity. The combination of good colouring properties and known toxicity of lead chromate pigments means there is no realistic commercial alternatives, it is claimed.

LEAD CHROME COLOURS
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.559578

Item 357
Plastics and Rubber Weekly
No.1599, 18th Aug.1995, p.16
UPSTREAM INNOVATIONS

Ciba's development of its DPP red organic pigment, launched at K'89, was ideally timed for cadmium replacement. Now Ciba is building on the familiar red shade with extensions into orange and blue shade reds. Chromophtal DPP Orange TRP and Chromophtal DPP Rubine TR have been developed for PVC and polyolefin colouring. These new grades, together with Chromophthal Yellow GT-AD, can produce a wide range of highly transparent shades which are especially effective in nucleated grades of PP. Another striking development has been BASF's Lumogen F range of fluorescent dyes suitable for the manufacture of luminescent solar concentrations. The concept can also be used to increase the visibility of bicycle or road reflectors and road signs.

CIBA PIGMENTS; BASF UK LTD.; HOECHST UK LTD.
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.559564

Item 358
Plastics and Rubber Weekly
No.1599, 18th Aug.1995, p.9-10
CADMIUM CHANGE CHALLENGE

With 10 more polymers due to find cadmium-based pigments proscribed later this year, the Cadmium Association wants the EC to take account of the significant difficulties and important consequences of replacing cadmium pigments in polyolefins such as PP and HDPE and engineering thermoplastics such as nylon and ABS. Melamine formaldehyde, urea formaldehyde and PU producers which have changed have found that their costs have doubled, it is claimed. All PP users are adamant that they cannot abandon cadmium pigments at this time without large cost increases, significant reduction in shades offered and a loss in productivity.

CADMIUM ASSN.
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.559555

Item 359
Plastics Technology
41, No.7, July 1995, p.44-52
COLOUR CONCENTRATES, A NEW PALETTE EMERGES
Sherman L M

The need to find suitable alternatives to heavy metals and diarylides as pigments in colour concentrates is discussed. Tradeoffs in performance against the environmental and health risks associated with cadmium and lead are examined, and the developments in special effects, micropellets and superconcentrates are discussed.

USA

Accession no.558395

Item 360
Antec '94. Conference Proceedings.
San Francisco, Ca., 1st-5th May 1994, Vol.III, p.2542-5. 012
CADMIUM-, LEAD-, MERCURY- AND HEXAVALENT CHROMIUM-FREE COLOUR FOR MELT PROCESSABLE FLUOROPOLYMERS
Parikh S; Creed L
ICI Fluoropolymers
(SPE)

The development by ICI Fluoropolymers of heavy metal-free colour concentrates for its melt processable fluoropolymers used in cable and wire insulation applications is described. Data are presented for bulk density, melt flow rate, pellet diameter, dispersion quality and colour coordinates. 2 refs.

USA

Accession no.555570

Item 361
Antec '94. Conference Proceedings.
San Francisco, Ca., 1st-5th May 1994, Vol.III, p.2529-36. 012
CADMIUM-FREE COLOURED ENGINEERING PLASTICS FOR THE AUTOMOTIVE INDUSTRY
Mulholland B M
Hoechst Celanese Corp.
(SPE)

A research programme undertaken by Hoechst Celanese to develop cadmium-free colours for UV stabilised acetal copolymers, PBTP and nylon 66 for use in the automotive industry is described. The evaluation of cadmium alternatives, optimisation of UV stabiliser systems for cadmium-free pigments and problems of metamerism are discussed. 1 ref.

USA

Accession no.555568

Item 362
Antec '94. Conference Proceedings.
San Francisco, Ca., 1st-5th May 1994, Vol.III, p.2508-13. 012
COLOURING OF A NOVEL POLYPROPYLENE/ POLYSTYRENE ALLOY
Okamoto K T; Huang M C T; McGrath P A; Harris R M
Himont USA Inc.; PMS Consolidated
(SPE)

Surface appearance and colourability were investigated for specimens of a PP/PS blend compounded with different colourants. The effects of colourants on mechanical properties were also studied. 5 refs.

USA

Accession no.555564

Item 363
Polymers Paint Colour Journal
185, No.4367, May 1995, p.28/30
CERIUM-BASED PIGMENTS: THE ALTERNATIVE TO CADMIUM AND LEAD
Velleret G; Macaudiere P; Le Roux O; Seigneurin A
Rhone-Poulenc Recherches

Tests carried out at Rhone-Poulenc indicate the potential for cerium-based pigments to replace heavy metal pigments, especially cadmium or lead based pigments in the orange or red hues spectrum. Properties of cerium pigments are shown to be similar to those based on heavy metals, but without the environmental problems associated with the latter. Rhone-Poulenc is reported to be moving towards pilot-scale production, with plans for a pre-industrial unit before the end of 1995.

EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; WESTERN EUROPE

Accession no.554543

Item 364
Polymers Paint Colour Journal
185, No.4367, May 1995, p.26-7
MICA PIGMENTS IN POWDER COATINGS
Maisch R; Stahlecker O; Kieser M
Merck E.

The nature and use of mica pigments in powder coatings applications is discussed. Characteristics of pearlescence and methods of achieving it are described. The range of pearl pigments developed by Merck is mentioned, and the benefits they can provide are outlined. 18 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.554542

Item 365
Chemical Marketing Reporter
247, No.24, 12th June 1995, p.SR12-3
CHANGING COLOUR
Shearer B

Producers of plastics colourants are riding a demand surge created by the general US economic expansion. Colourants make up 15% of the overall market for plastics additives. Worldwide, the market value is estimated at 5 billion US dollars. Sales growth for this year is expected at 5%. The chief technical challenge facing the colourant industry for the last few years has been the substitution of organic pigments for inorganic pigments. The chief liability of inorganic pigments is their heavy metal content. Lead, barium, chrome and cadmium are all marked for phase-out as the industry makes the transition to more environmentally acceptable options. As colourant products are up to 80% commodity resin, the industry has been hard hit by the 1994 runup in the price of resin. Over the last six months, there has been only a 4% increase in pigment prices.

USA

Accession no.552773

Item 366
European Plastics News
22, No.5, May 1995, p.55
COLOURED TRANSLUCENT PLEXIGLAS

It is briefly reported that Rohm is now using weather-resistant dyestuffs in its translucent Plexiglas sheets. These colour formulations have been developed to overcome the rapid loss of fluorescence in acrylic or PS sheets when in outdoor use. The special colours, Red 2713 and Orange 2723, are said to be the first of their kind.

ROHM GMBH

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.552087

Item 367
Paint & Ink International
8, No.2, March/April 1995, p.2/5

SUBSTITUTION OF LEAD AND CHROMATE PIGMENTS IN COLOURED TOP COAT SYSTEMS
Novak K
Bayer AG

Alternatives to lead and chromate pigments in top coat systems are reviewed following the health hazards associated with the use of arsenic, lead, cadmium and various metal chromate pigments in coatings, and regulations affecting their use in such applications. The question of costs is addressed, and it is found that lead-free pigments are more expensive when matching highly saturated shades, and that generally speaking this is by a factor of three. Alternative pigments are discussed with reference to performance in such matters as hiding power, gloss and gloss retention on exposure to weathering.

EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.550088

Item 368
Pitture e Vernici
71, No.6, April 1995, p.30-32
Italian; English
THE ORGANIC PIGMENTS AND THEIR EFFECTS ON TOXICOLOGY AND ENVIRONMENT. (PART 2)
Hunger K

The toxicity of organic pigments is discussed, with particular reference to mutagenic effects. The Ames test, tests for chronic toxicity through inhalation and skin absorption, levels of impurities, and environmental aspects are all considered.

Accession no.549923

Item 369
Modern Plastics International
25, No.4, April 1995, p.107
PEARLESCENT PIGMENTS

It is briefly reported that pearlescent pigments can be combined with ultrafine titanium dioxide to produce "flip-flop" or frosty effects. The ultrafine titanium dioxide used for this has a particle size of around 20nm, compared with 200nm for normal grades. It strongly absorbs radiation in the UV spectrum and shows most of its scattering power in the blue spectrum. Ultrafine titanium dioxide from Kemira costs around 30 US dollars/kg.

KEMIRA OY
FINLAND; SCANDINAVIA; WESTERN EUROPE

Accession no.549702

Item 370
Modern Plastics International
25, No.4, April 1995, p.36
NEW MATERIALS SPROUT
Mapleston P

It is briefly reported that cerium-based pigments have been the subject of intense research over the last three years at Rhone Poulenc and are intended as alternatives to cadmium reds and oranges, with yellows and blues cited as possible future development avenues. The pigments are said to have tinting strength 50-70% that of cadmiums, similar hiding power, high heat stability, zero migration, and because they do not crystallise polymers like PP, they do not cause warpage.

RHONE-POULENC SA
EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; WESTERN EUROPE

Accession no.549686

Item 371
Plastics World
53, No.3, March 1995, p.24-8
SUBSTITUTE ORGANIC PIGMENTS CREATE TECHNICAL CHALLENGES
Smock D

Phaseout of environmentally unacceptable inorganic pigments with heavy metals is continuing. However, the substitute products are often less colourful, less stable and may present a whole new set of health and safety issues. Processing problems are briefly discussed. Special effects dominate new product offerings including edge glow, pearlescent, fluorescent, speckled and sparkle effects. New pigments which have come onto the market are outlined.

USA

Accession no.548240

Item 372
Brookfield, Ct., 1994, pp.244. USD.100. 11ins. 31/3/95. 52
COLOR AND APPEARANCE RETEC : EFFECTS IN PLASTICS. PROCEEDINGS OF A REGIONAL TECHNICAL CONFERENCE HELD OAK BROOK, IL., 20TH-22ND SEPT.1994
SPE,Color & Appearance Div.; SPE,Chicago Section

Twenty-five papers address aspects of colour and appearance in plastics. Themes examined include processing conditions and their effect on colour, special effect colourants and non-dispersing pigments for thermoplastics, measurement techniques for special effect colours, review of progress in the colouration of plastics, fluorescent pigments as plastic colourants, and improving the processability of fluorescent pigments.

USA

Accession no.547932

Item 373
Antec '94. Conference Proceedings.
San Francisco, Ca., 1st-5th May 1994, Vol.II, p.1904-7. 012

EFFECTS OF COLOURANTS ON THE SHRINKAGE OF POLYESTER
Neubert C J
Pennsylvania,State University
(SPE)

The influence of a number of pigments on the shrinkage of injection moulded PBTP parts was investigated. 6 refs.

USA

Accession no.546537

Item 374
Polymers Paint Colour Journal
185, No.4364, Feb.1995, p.S2/5
EFFECT PIGMENTS BASED ON TITANIUM DIOXIDE
Eskelinen P
Kemira Pigments Oy

Titanium dioxide has proved to be a versatile material for the production of effect pigments. This comprehensive article assesses the basic characteristics of effect pigments derived from titanium dioxide, and describes the use and visual appearance of coatings containing ultrafine titanium dioxide, pearlescent pigments and aluminium pigments.

FINLAND; SCANDINAVIA; WESTERN EUROPE

Accession no.546262

Item 375
High Performance Plastics
March 1995, p.2
NON-CADMIUM DEVELOPMENT IMPROVES PERFORMANCE OF ACETAL
Murphy J

US plastics manufacturers have developed alternatives to cadmium containing pigments, in anticipation of stricter environmental regulations. The article supplies details of these developments from major players such as Hoechst Celanese and BASF. The advantages of the new cadmium-free technology, used in acetal polymers, include better UV stability, up to 50% cost savings and improved impact and scuff resistance.

BASF AG; HOECHST CELANESE CORP.
USA

Accession no.545621

Item 376
Plastiques Modernes et Elastomeres
46, No.6, July/Aug.1994, p.25-6
French
IMPROVING POLYMERS
Topuz B

Following a brief review of additives used in the plastics industry, an examination is made of types of pigments and blowing agents and criteria for their selection. Data are presented for decomposition temperatures and gas production of a number of blowing agents.

SANDOZ AG; EMACOLOR SA; SARMA; SANDOZ HUNINGUE SA; DU PONT DE NEMOURS E.I.,& CO.INC.; ICI; ELF ATOCHEM SA; SOLVAY SA
BELGIUM; EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; ITALY; SWITZERLAND; UK; USA; WESTERN EUROPE

Accession no.544262

Item 377
European Plastics News
22, No.3, March 1995, p.47
WHITE PEARLESCENT PIGMENT

Mearl Corp. has introduced a white pearlescent pigment to its range of Mearlin MagnaPearls. The Mearlin MagnaPearl 2300 is characterised by superior brilliance in comparison with earlier grades, it is claimed. The new grade also offers the processor good coverage and economy. Particle size range is between 5-25 microns. The increased brilliance and whiteness offer strong eye-appeal, particularly in packaging applications. The lustre pigment is both laser-markable and microwave friendly. This abstract includes all the information contained in the original article.

MEARL CORP.
USA

Accession no.544212

Item 378
Plastics and Rubber Weekly
No.1575, 3rd March 1995, p.9
COLOURING FOR THE FUTURE
Robinson T

The power of colour to attract a consumer to a product was discussed at the recent ColourPlas 95 in Manchester. It is vital to use the right colours in the right houseware market and this can be helped with trial marketing at key outlets, Addis claimed. The International Cadmium Association, with the BPF, is planning a fight back for cadmium-containing pigments. The ICA's position is that while there are concerns over cadmium's toxicology, these do not extend to the insoluble cadmium salts which are used as pigments. Rhone-Poulenc has recently announced a range of cerium sulphide pigments. Currently, the material is available in very limited quantities. There are two pigments in the range at the moment, orange and red.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.543101

Item 379
Plastics and Rubber Weekly
No.1571, 3rd Feb.1995, p.6
TEMPERATURE SENSITIVE COLOUR

It is briefly reported that Victor International Plastics has introduced a new range of thermochromic colour concentrates and compounds. Called Chameleon, the

organic pigments change colour at different temperatures. Potential applications include promotional goods, ice buckets and scrapers, cups and key rings. They could also have a role in product safety as temperature warning indicators for hot kettles and baby bottles. Not only do the materials change from colour to colour, other versions are available in which the colours disappear or appear. Initially, masterbatches using the concentrates will be available in LDPE, HDPE, PP homo and copolymers, crystal PS and ABS resins.

VICTOR INTERNATIONAL PLASTICS LTD.
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.540031

Item 380
European Plastics News
22, No.1, Jan.1995, p.40
DRIER ULTRAMARINE PIGMENTS

Holliday Pigments International has introduced Premier D low moisture ultramarine pigments. The range was developed in response to customers involved in production of masterbatch and compound. Standard ultramarine is naturally hydrophilic, so absorbs water. The pigment can contain up to 2% absorbed moisture, which can affect the quality of the pigment masterbatch, especially at high pigmentation levels. Premier D pigments have a surface moisture level of 0.05%, so high pigment loadings can be achieved in masterbatches. This will improve the quality, with less blowing and improved strand strength. This abstract includes all the information contained in the original article.

HOLLIDAY PIGMENTS INTERNATIONAL
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.539141

Item 381
Plastiques Flash
No.270, April 1994, p.58-60
French
PIGMENTS, ADDITIVES AND MASTERBATCHES

The range of pigments, stabilisers, flame retardants and plastics masterbatches produced by Sandoz Huningue of France is described. Some new product developments are reviewed.

SANDOZ HUNINGUE SA; SANDOZ AG; SANDOZ CHIMIE FRANCE
EUROPEAN COMMUNITY; EUROPEAN UNION; FRANCE; SWITZERLAND; WESTERN EUROPE

Accession no.535454

Item 382
British Plastics and Rubber
Nov.1994, p.46
GE BACKS PC MILK BOTTLE INSTALLATION FROM CRADLE TO GRAVE

A washing and filling line for returnable polycarbonate milk bottles has been installed by Milchwerke Thueringen. It was set up in cooperation with GE Plastics, using Lexan polycarbonate. Details are given of the design of the system which uses brown pigmented bottles, which are claimed to halve the loss of vitamin C by exposure to light.

MILCHWERKE THUERINGEN; GE PLASTICS
EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.534685

Item 383
Chemical Marketing Reporter
246, No.15, 10th Oct.1994, p.SR12/6
LOOKING VERY GOOD
Hoffman J

Inorganic pigments are enjoying very strong growth. Sales are particularly promising for titanium dioxide and carbon black, the chief white and black pigments, although demand is falling for pigments containing lead and chromium, due to environmental pressure. On a worldwide basis, titanium dioxide is a 3 million ton market and carbon black, when all uses are included, is a 5 million ton business. Worldwide titanium dioxide pricing has risen steadily over the past year, with global prices expected to be roughly 1,900-2000 US dollars per metric ton by the end of the year. Carbon black producers expect production to grow 3-6% in 1994. Annual US demand has surpassed 3 billion pounds, with tyres consuming nearly 2.2 billion pounds.

WORLD

Accession no.531518

Item 384
Chemical Week
155, No.13, 12th Oct.1994, p.45-6
PIGMENTS
Mullin R

Pigments makers continue to remove VOCs and facilitate lower VOC levels in final formulations. They are also making advances in introducing alternatives to heavy metals in industrial and maintenance paints and coatings. Pigment and colourant system manufacturers are also targeting improvements to support higher performance coatings. Hoechst Celanese has introduced quinacridone and carbazole violet pigments with enhanced flow properties. Engelhard has focused recently on organic yellows to replace traditional lead chromate pigments in the water-borne traffic-grade market. Huls America has developed a zero-VOC colourant system that has a broad application in water- and oil-based paints.

USA

Accession no.529133

Item 385
Plastics and Rubber Weekly
No.1553, 16th Sept.1994, p.12
NEW TITANIUM DIOXIDE IS HERE

DuPont's titanium dioxide pigment R-104 is designed to give good optical and rheological performance at higher loadings in polyolefin masterbatch formulations. It is also claimed that film producers can operate at higher temperatures because of the low volatility of the product. The new grade has the same tinting strength and blue undertone of Ti Pure R-103 at higher loadings than was possible with earlier grades. R-104 is said to process quickly so it reduces cycle time while maintaining good dispersion. It also has low moisture uptake. This abstract includes all the information contained in the original article.

DUPONT (UK) LTD.
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.527358

Item 386
Plastics and Rubber Weekly
No.1553, 16th Sept.1994, p.11
FLUORESCENT PIGMENTS

It is briefly reported that fluorescent pigments play an important part in the consumer appeal of novelty ice cube trays from Rhondda-based Mendle. The trays consist of two piece fluorescent moulds made in PE. The trays are filled under the tap through four filler holes. To remove the ice cubes, cold or luke warm water is run over the underside of the tray until the two halves of the mould separate. Ice cube shapes include fruit, faces and dice.

MENDLE
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.527355

Item 387
Plastics and Rubber Weekly
No.1553, 16th Sept.1994, p.10
ROTEC STRIKES THE BALANCE

It is briefly reported that Rotec claims the balance between colour formulation, cost and its performance is becoming increasingly difficult to satisfy. EU Directives to reduce cadmium usage and the restrictions on the use of diarylide and lead-based pigments are causing particular difficulties. Reformulation inevitably increases colouring costs, sometimes causing two or threefold price increases. Pressure to reduce raw material costs has resulted in lowering of product performance, particularly in areas of longer term lightfastness of colour or weathering resistance of the polymer, it is claimed.

ROTEC
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.527351

Item 388
Plastics and Rubber Weekly
No.1552, 9th Sept.1994, p.10
PIGMENTS: CHANGE CONTINUES

The latest developments in pigments are outlined. Rhone-Poulenc and Ferro are cooperating in a joint venture to measure the market for inorganic alternatives to cadmium pigments, focused on cerium sulphide. BASF's Lumogen F product line was developed as a fluorescence collector in solar cell technology and has been used by Honda in the plastic panelling of its new all terrain vehicles and motor scooters. Ciba Pigments has commissioned a new warehouse and distribution centre in Manchester. Cairn Chemicals has introduced a new blue for engineering thermoplastics and will also be distributing Rublon rubber colourants. Hoechst has extended its range of Renol AT/NT polyester masterbatch materials and is looking to interest the market for PETP and PBTB for engineering and bottle applications in a wide range of colours.

WORLD

Accession no.525038

Item 389
Plastics and Rubber Weekly
No.1552, 9th Sept.1994, p.9
CD COLOURS MORE HOPE

The UK Cadmium Association, which represents cadmium pigments and PVC stabilisers makers, has joined its US counterpart, forming the International Cadmium Association. The merger is to boost Association response to the increasingly international markets for cadmium-based plastic additives among others and the regulatory threats to them. Several key regulatory authorities are beginning to recognise the extreme low solubility, and so toxicity, of cadmium pigments. The new association is preparing a dossier detailing technical and cost-related problems associated with replacing cadmium pigments.

INTERNATIONAL CADMIUM ASSOCIATION
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; USA; WESTERN EUROPE

Accession no.525037

Item 390
Polymers Paint Colour Journal
184, No.4353, 13th July 1994, p.344/8
COLOURS FOR A BRIGHTER FUTURE
Rosen R
Swada (London) Ltd.

Processing and formulating advice is given for the use of fluorescent colours. The nature of organic dyes, and the requirements for their effective fluorescence is examined. Latest product developments are announced, and include pigments and concentrates available from Haeffner & Co. These include FTX and OLX products for use in coatings.

HAEFFNER H.,& CO.LTD.
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.524020

Item 391
Polymer Degradation and Stability
44, No.3, 1994, p.357-74
PHOTOFADING AND LIGHT STABILITY OF DYED AND PIGMENTED POLYMERS
Allen N S
Manchester,Metropolitan University

This review deals with all aspects of dye and pigment stability and their influence on the polymer matrix together with the effects of environmental parameters. With regard to the latter, oxygen and moisture are crucial as was recognised in work done in 1888 on the fading of artists pigments. Photosensitising and stabilising action of dyes and pigments are discussed. 84 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.523534

Item 392
Polymer International
34, No.4, Aug.1994, p.351-61
PIGMENTS, DYES AND FLUORESCENT BRIGHTENING AGENTS FOR PLASTICS: AN OVERVIEW
Christie R M
Scottish College of Textiles

Articles manufactured from plastic materials are generally enhanced visually by the incorporation of pigments, dyes and fluorescent brightening agents. This article provides an overview of the requirements of these colouring materials for use in plastics and of the structures and properties of the most important products in commercial use. 31 refs.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.523513

Item 393
Modern Plastics International
24, No.7, July 1994, p.59
LOW-DUST, RED-TINTED

Low-dust, red-tinted yellow Sicotan pigment grades K 2011 FG, 2107 FG, 2111 FG and 2112 FG from BASF are in fine granulate form and additive-free. The products have the same colouring properties as powder Sicotan grades, but have better free-flowing properties which allow for more exact dosing, the company claims. Dosing units are easier to clean than with powders and low dust levels also improve working conditions. This abstract includes all the information contained in the original article.

BASF AG
EUROPEAN COMMUNITY; EUROPEAN UNION; GERMANY; WESTERN EUROPE

Accession no.522196

Item 394
Modern Plastics International
24, No.7, July 1994, p.58-9
ULTRAMARINE PIGMENTS

It is briefly reported that Reckitts Colours has introduced ultramarine pigments with low moisture contents. Premier D grades have specified levels under 0.05%, compared with an average 1.5% water content for normal ultramarines. The new grades will also allow higher pigment loadings. In tests to date, good quality concentrates have been produced based on MFI 20 PE with 68% pigment, using a twin-screw extruder vented to atmosphere. Future tests are planned with ABS and PETP.

RECKITTS COLOURS LTD.
EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.522195

Item 395
Enhancing Polymers using Additives and Modifiers. Symposium Proceedings.
Shawbury, 6th Oct.1993, Paper 1. 5
FACTORS INFLUENCING SELECTION OF PIGMENTS
Guyett J P
Silvergate Plastics Ltd.
(Rapra Technology Ltd.; Institute of Materials)

This fairly brief paper discusses selection of pigments for enhancement of processing and properties of polymers. Types of pigments described are cadmium, lead chrome, diarylide and heavy metal pigments, and their toxicity is discussed.

EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

Accession no.521581

Item 396
Plastics Compounding
17, No.2, March/April 1994, p.62-4
SPECIAL: PIGMENTS SUPPLIER LOCATOR

The current US legislation regarding the use of cadmium and lead pigments is explained. A chart is provided, which indicates which pigments - organic and inorganic - are supplied by approximately sixty companies. A directory listing then provides the relevant contact information.

COALITION OF NORTHEASTERN GOVERNORS; US,OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION; COLOR PIGMENTS MANUFACTURERS ASSOCIATION
USA

Accession no.516070

Item 397
European Plastics News
21, No.6, June 1994, p.35
REDDISH-YELLOW PIGMENTS

It is briefly reported that BASF has introduced four reddish-yellow pigments in the form of fine granulates for colouring plastics. The new Sicotan Gelb granulates are free of additives, low in dust and are easy to pour. The colour characteristics and intensities are said to be identical to corresponding Sicotan brands in powder form, which are still available.

BASF AG
EUROPEAN COMMUNITY; GERMANY; WESTERN EUROPE
Accession no.514670

Item 398
Weathering Well with Colorants & Additives. Retec Proceedings.
Orlando,Fl., 11th-13th Oct.1993, p.285-301. 5
WEATHERABILITY OF PRECOLOURED TPO SYSTEMS FOR AUTOMOTIVE APPLICATIONS
Lau E; Mullins B
D & S Plastics International
(SPE,Color & Appearance Div.; SPE,Polymer Modifiers & Additives Div.)

Information is presented in some detail on the development of precoloured, UV stabilised elastomer modified PPs for automotive applications. Weatherability of pigments (Red 177, Red 202, Red 254 and Blue 15:3) is evaluated.

USA
Accession no.513810

Item 399
Weathering Well with Colorants & Additives. Retec Proceedings.
Orlando,Fl., 11th-13th Oct.1993, p.253-70. 5
APPLICATION OF YELLOW PRASEODYMIUM DOPED ZIRCON PIGMENT IN PLASTICS
Blonski R P
Ferro Corp.,Color Div.
(SPE,Color & Appearance Div.; SPE,Polymer Modifiers & Additives Div.)

Properties of the yellow Praseodymium doped zircon pigment are discussed in some detail. This pigment, it is reported, can be used in plastics if the particle size distribution is carefully controlled. Information is presented on the pigment's weatherability, chemical stability and optical properties. 6 refs.

USA
Accession no.513808

Item 400
Weathering Well with Colorants & Additives. Retec Proceedings.
Orlando,Fl., 11th-13th Oct.1993, p.203-25. 5
WEATHERABLE, HEAVY-METAL-FREE COLOURANTS FOR ACRYLIC FILMS
Desai V; Zeller R C
Wilson Color Inc.
(SPE,Color & Appearance Div.; SPE,Polymer Modifiers & Additives Div.)

This paper discusses in some detail the results of replacing heavy metal pigments (i.e. lead, chrome, cobalt and cadmium-containing pigments) with high performance organic colourants in acrylic films. It is reported that 12 heavy-metal-free pigments and 5 inorganic heavy metal-containing pigments were used in the compression moulding of film grade acrylic compounds (one white and one clear). The moulded plaques produced were said to be evaluated (in mass tone and tint tone) for heat stability, weatherability and colour difference. Results are discussed.

USA
Accession no.513806

Item 401
Weathering Well with Colorants & Additives. Retec Proceedings.
Orlando,Fl., 11th-13th Oct.1993, p.105-28. 5
WEATHER RESISTANT COLOURATION OF POLYOLEFINS USING ORGANIC PIGMENTS
Johnson G A
Ciba-Geigy Ltd.
(SPE,Color & Appearance Div.; SPE,Polymer Modifiers & Additives Div.)

This paper discusses in detail results of tests carried out to determine the weatherability of organic pigmented polymer systems. Information is presented on test procedures, test conditions and results of colour retention tests, effect of stabilisation on colour retention, effect of concentration and titanium dioxide. Colour retention at the three test sites (Florida, Bandol and Pfeffingen) are compared.

SWITZERLAND; WESTERN EUROPE
Accession no.513801

Item 402
European Plastics News
21, No.5, May 1994, p.33
NEW COLOUR RANGE

Doeflex has launched a new range of colours for all of its PS thermoforming sheet materials. The new range provides more standard colour options, it is claimed. A full colour matching service is also available with all colour pigments being cadmium-free and complying with EN71/3. The company is among Europe's leading sheet producers and its product range includes high impact and super high impact grades in thicknesses down to 250 microns. This abstract includes all the information contained in the original article.

DOEFLEX INDUSTRIES LTD.
EUROPEAN COMMUNITY; UK; WESTERN EUROPE
Accession no.512716

Item 403
Plastics World
52, No.3, March 1994, p.48-50
CONCEPT COLOURS ARE STILL THE RAGE
Moskowitz M

Colourant and pigment suppliers claim there is increased interest in more specialised materials. Teknor Color has added another new product to its specks/granite line, the Tek Specks HT Series. The six new colours in the Tek Sparkles Blizzard Series contain a maximum loading of silver sparkles which creates the blizzard effect. Keystone Aniline's Granite Color Series is comprised of eight different pigments that give plastic products the look of actual stone. Thermally stable, non-yellowing white colour concentrates for use in plastics that are processed at high temperatures are new from Polymer Color Inc.

USA

Accession no.511145

Item 404
Plastics and Rubber Weekly
No.1528, 25th March 1994, p.16
PIGMENT PROBLEMS FOR MASTERBATCH MAKER
Smith A

The change from cadmium to organic pigments has caused Gabriel-Chemie UK, a masterbatch maker, to apply more stringent processing conditions. The parent Austrian company is making co-rotating twin-screw compounding extruders of its own design and these are being progressively introduced at the Kent plant. The processing requirements of organic pigments are discussed. The new organic masterbatches, compared with cadmium, are much more expensive to manufacture. The problem centres on fading and heat stability. Fade is measured on the Blue Wool scale and there is a correlation between the price and the processing temperature of an organic masterbatch and its liability to fade. A table is presented illustrating this.

GABRIEL-CHEMIE UK
EUROPEAN COMMUNITY; UK; WESTERN EUROPE

Accession no.509285

Item 405
Plastics News(USA)
5, No.51, 21st Feb.1994, p.17
DYE MASKS CLOUDING OF RECYCLED PET

A blue dye has been developed by M.A.Industries Inc. which is being used in post-consumer PETP products to mask the yellowing which occurs. The dye will improve the clarity of the material in packaging applications. Brief details are given.

M.A.INDUSTRIES INC.
USA

Accession no.509245

Item 406
BIBRA Bulletin
33, No.2, 1994, p.67
FOOD-CONTACT ADDITIVES

Amended food-contact additives are detailed as regulated by the FDA. C.I. Pigment Red 187 is permitted for use as a colourant for all polymers intended for use in contact with food, and 3,5-di-tert-butyl-4-hydroxyhydrocinnamic acid triester with 1,3,5-tris(2-hydroxyethyl)-S-triazine-2,4,6-(1H,3H,5H)-trione as an antioxidant for polyester elastomers in contact with dry food and rubber articles for repeated food-contact use. In addition, food additive regulations to expand the use of aromatic petroleum hydrocarbon resin hydrogenated, as a component of wax polymer blend coatings for paper and paperboard in contact with fatty foods are noted. This abstract includes all the information contained in the original article.

US,FOOD & DRUG ADMINISTRATION
USA

Accession no.508185

Item 407
Antec '93. Conference Proceedings.
New Orleans, La., 9th-13th May 1993, Vol.I, p.429-32.
012
VARIATION OF SHRINKAGE IN COMMODITY PLASTICS RESULTING FROM THE ADDITION OF COLOURANTS
Broadhead B; Koch P
Pennsylvania,State University
(SPE)

Results are presented of a study of the influence of colourants on the shrinkage of PE and PP in injection moulding. 1 ref.

USA

Accession no.507385

Item 408
Antec '93. Conference Proceedings.
New Orleans, La., 9th-13th May 1993, Vol.I, p.424-8.
012
CADMIUM, LEAD, MERCURY AND HEXAVALENT CHROMIUM FREE COLOUR FOR FLUOROCOMP (PTFE COMPOUND)
Parikh S S; McCullough P C
ICI Fluoropolymers
(SPE)

An account is given of studies of heat stability, colour and mechanical properties undertaken by ICI Fluoropolymers to evaluate inorganic pigments as replacements for heavy metal based pigments in its Fluorocomp PTFE compounds.

USA

Accession no.507384

Item 409
Antec '93. Conference Proceedings.
New Orleans, La., 9th-13th May 1993, Vol.I, p.13-5. 012
RED CERIUM SULPHIDE PIGMENTS: NEW CADMIUM-FREE INORGANIC RED PIGMENTS FOR THE PLASTICS INDUSTRY
Velleret G
Rhone-Poulenc Recherches
(SPE)

The dispersibility, colour strength, hiding power, thermal stability and light fastness of red cerium sulphide pigments were investigated in PP samples. 7 refs.

EUROPEAN COMMUNITY; FRANCE; USA; WESTERN EUROPE

Accession no.507298

Item 410
Antec '93. Conference Proceedings.
New Orleans, La., 9th-13th May 1993, Vol.I, p.6-8. 012
USE OF REFLECTANCE SPECTRA TO PREDICT HEAT BUILD-UP OF PIGMENTED PVC PANELS
Sullivan T; Peake G
Shepherd Color Co.
(SPE)

Using heat build-up data obtained by ASTM D4803-89, a method was developed for predicting the heat build-up of pigmented PVC panels based on spectral measurements of the amount of light absorbed by the panels. The total amount of light absorbed by a sample over the wavelength region of 200-2,500 nm, as quantified by intensity factor, was shown to correlate very well with heat build-up determined by the ASTM method. 4 refs.

USA

Accession no.507296

Item 411
Antec '93. Conference Proceedings.
New Orleans, La., 9th-13th May 1993, Vol.I, p.2-5. 012
PRECOLOURED PLASTICS FOR MEDICAL APPLICATIONS: MEETING FEDERAL AND STATE REGULATIONS
Parikh S; Muschick M
Monsanto Co.
(SPE)

The use by Monsanto of mixed metal oxide colourants in its Lustran ABS for medical applications is described. It is shown that such colourants comply with the requirements of environmental regulations, as demonstrated by the results of leaching tests. 3 refs.

USA

Accession no.507295

Item 412
Polymers Paint Colour Journal
184, N0.4342, 12th/16th Jan.1994, Pigments Suppl., p.S1
MICA PIGMENTS IN COATINGS
Maisch R
Merck E.

The characteristics of Merck's Iriodin pearlescent pigments are briefly described along with the way to achieve an optimum pearl lustre. The use of these pigments in automotive and industrial paints is briefly discussed and recent developments in this field are indicated.

EUROPEAN COMMUNITY; GERMANY; WESTERN EUROPE

Accession no.502922

Item 413
Plastics Technology
39, No.12, Nov.1993, p.89
CADMIUM PIGMENTS NO HAZARD IN MOULDING
Naitove M H

It is reported that a recent scientific study by researchers at GE Plastics found no detectable amounts of airborne cadmium emitted during injection moulding of cadmium pigmented engineering plastics. The company initiated the research after a new OSHA standard was published in 1992, which established a lower permissible exposure limit for cadmium fumes and dust of 5 mg/cub.m of air. Details are given.

GE PLASTICS
USA

Accession no.499589

Item 414
Plastics World
51, No.11, Nov.1993, p.34-5
HEAVY METAL-FREE LUSTRE PIGMENTS

Mearl has expanded its Mearlin MagnaPearl Lustre Pigments to include two new grades, MagnaPearl 1100 and 2100. These are bright, white pearlescent pigments that are heavy metal-free. Both are titanium dioxide coated, mica. MagnaPearl 1100 has an average particle size of 20 microns while 2100 is 10 microns. They are available in powder form, and like all MagnaPearls, are environmentally friendly pigments, non-metallic and non-toxic for use in plastics, surface coatings and printing inks. This abstract includes all the information contained in the original article.

MEARL CORP.
USA

Accession no.498237

Item 415
Paint & Ink International
6, No.3, Sept.1993, p.13/9
DEVELOPING AND EVALUATING NON-TOXIC ANTI-CORROSIVE PIGMENTS AND COATINGS
Austin J

Halox Pigments

This comprehensive article assesses the problems associated with protecting metals from corrosion and considers the factors involved in developing and evaluating non-toxic, anti-corrosive pigments and coatings. These include the substrate, the environment, surface preparation, PVC, vehicle selection and inhibitive pigment. 24 refs.

USA

Accession no.497510

Item 416
Journal of Vinyl Technology
15, No.3, Sept.1993, p.148-52
COLOURING OF PVC
Sarvis H E
Ferro Corp.

The major colourant types and families that are used to colour PVC are reviewed, including coloured compounds, blended dry colour and colour concentrates. Reference is made to properties required for end-use applications, including heat stability, lightfastness, weatherability, migration, blooming, chemical resistance and electrical resistance. The continued use or replacement of lead- and cadmium-bearing colourants is discussed. 9 refs.

USA

Accession no.497130

Item 417
British Plastics and Rubber
Nov.1993, p.6
SETTING STANDARDS FOR COLOUR MATCHING

Pantone, a well-known name in the graphics arts field as a standard for colour definition, has not, until now, been extended to the plastics industry. During the summer of this year, however, the company introduced a plastics colour matching system in the USA, and has brought it to Europe for launching at the UK Interplas exhibition. The Pantone Plastics Color System exists as a set of 2,820 coloured plaques in opaque and transparent colours including pearlescents, fluorescents and metallics. Details are given.

PANTONE INC.
USA

Accession no.496886

Item 418
Plastics News(USA)
5, No.29, 13th Sept.1993, p.33/8
CUSTOMERS WANT MORE COLOUR, LESS RESIN
Charnas D

The trend towards higher loading levels of pigment in colour concentrates is discussed. This reduces the amount of non-specification resin introduced into the plastic processor's material stream. The challenge to colour concentrate manufacturers is to disperse such a high percentage of pigment (40% or more) in the carrier resin and to effect its dispersion consistently through the customer's natural resin. The effect of these trends on company activities is outlined.

USA

Accession no.496012

Item 419
Plastiques Modernes et Elastomeres
45, No.6, July/Aug.1993, p.32/7
French
COLOURING EVERYTHING, OR ALMOST
Guyard C

A survey is made of developments by a number of companies in pigments and colour masterbatches for the plastics industry. Difficulties associated with the replacement of heavy metal based pigments are discussed.

NESTE COLOR COMPOUND; MERCK; ELIAN; WILSON COLOR; GE PLASTICS; CHAIZE; SILBERLINE LTD.; ETABLISSEMENTS CARBONNEL & JACQUEMOT; SODIREP; HUBNER; COLOR SERVICE; IQAP; ASHLAND PLASTICS INTERNATIONAL; OMYA SA; MONSANTO EUROPE SA; DOW PLASTICS; RHONE-POULENC SA; CIBA-GEIGY AG; SNCI; SCHULMAN A.,INC.; ATOHAAS; 2R COULEUR
WESTERN EUROPE; WESTERN EUROPE-GENERAL

Accession no.495719

Item 420
Journal of Applied Polymer Science
49, No.10, 10th Sept.1993, p.1733-49
INTERACTION OF DYES USED FOR FOODS WITH FOOD PACKAGING POLYAMIDES
Arvanitoyannis I; Tsatsaroni E; Psomiadou E; Blanshard J M V
Loughborough,University; Thessaloniki,Aristotle University; Nottingham,University

The effects of pH, temperature, dye concentration and additives on the adsorption of the dyes FD & C (Food, Drugs & Cosmetics) Blue 1 and Blue 2 on the polyamides nylon 4 to 7, 9 and 10 to 12 were studied. A correlation was established between these parameters and dye uptake. The adsorption kinetics of the dyes on the polyamides were examined and a mechanism based on the interaction of the acid groups of the dyes and the positively charged groups of the polyamides developed. 44 refs.

EUROPEAN COMMUNITY; GREECE; UK; WESTERN EUROPE

Accession no.493517

Item 421
Modern Plastics International
23, No.9, Sept.1993, p.34-5

COLOURANTS
Rogers JK; Myers J

The movement to ban heavy metal colourants is reported to have reached the flood stage; in the USA about 22 states - more than double the number from last year - are restricting or banning heavy metals, including cadmium, selenium, and lead. The European Community may enact a ban in 1995. This trend is accompanied by the continuing introduction of heavy-metal-free products, primarily organic grades; a review of new products introduced by Ampacet Europe, Avecor, Bayer, Cabot Plastics, Chroma, Colloids, Colorco, Colortech, Englehard, Ferro, Hoechst, Holland Colours Apeldoorn, Kemira, Kerr-McGee Chemical, Mearl, Merck, Milliken Chemical, Prime Colorants, Reed Plastics, SCM Chemicals and Silberline is presented.

WORLD

Accession no.492965

Item 422
Revista de Plasticos Modernos
65, No.444, June 1993, p.635-8
Spanish
EFFECT OF PIGMENTS ON THE OPTICAL AND MECHANICAL PROPERTIES OF LLDPE/LDPE FILMS DURING PHOTODEGRADATION
Sanchez M C S; Orona F
Centro de Investigacion en Quimica Aplicada; Coahuila,University

A study was made of the effect of three different pigments (iron oxide, phthalocyanine blue and a blend of iron oxide and carbon black) on the optical and mechanical properties of films of LDPE/linear LDPE blends with 40 wt.% of linear LDPE, subjected to artificial ageing over different periods of time. Light transmission and reflectance, tensile strength, elongation at break, carbonyl group formation and chain scission by photodegradation were evaluated after different ageing periods. No significant change in optical properties was observed during photodegradation. Evaluation of the mechanical properties showed that the pigments had a photoprotective effect on the films. 7 refs.

MEXICO

Accession no.491567

Item 423
Journal of Applied Polymer Science
49, No.3, 15th July 1993, p.381-9
STUDY OF THE DISPERSION OF LOW-DENSITY POLYETHYLENE ADDITIVE MASTERBATCHES IN POLYOLEFINS
Ogbobe O
Loughborough,University

Light microscopy, X-ray microradiography and UV microscopy were used to examine pigment dispersion in LDPE pigment masterbatches and polyolefin/LDPE additive masterbatch extrudates. The results showed that the dispersion of pigments in the LDPE masterbatches was very poor. Also, the degree of dispersion of LDPE pigment and UV absorber masterbatches depended on the melt flow index of the polyolefin (HDPE). Blending was poor because of the two-phase nature of the mix. 16 refs.

EUROPEAN COMMUNITY; UK; WESTERN EUROPE

Accession no.485999

Item 424
British Plastics and Rubber
June 1993, p.20
CIBA IMPROVES PIGMENT PERFORMANCE AND COLOUR RANGE

Brief details are given of several polymer colour products from Ciba-Geigy. They include diketo-pyrollo-pyrole pigments, quinacridone pigments, bismuth vandates, and organic azo calcium salt pigments.

CIBA-GEIGY CORP.
USA

Accession no.483375

Item 425
Masterbatch ’91. Conference Proceedings.
Neuss, 27th-29th Nov.1991, Paper 5. 621
English; German
ORGANIC YELLOW PIGMENTS FOR MASTERBATCHES
Adams W
BASF Lacke & Farben AG
(Applied Market Information)

The results are reported of a study carried out to find replacements for Pigment Yellow 17 and Pigment Yellow 83 in LDPE. Criteria evaluated were colour equivalent (strength), hue, chroma, heat stability and accessibility in colour space. Various commercial organic yellow pigments, including diarylides, azo compounds, isoindolines and chinophthalones, were evaluated.

EUROPEAN COMMUNITY; GERMANY; WESTERN EUROPE

Accession no.478972

Item 426
Plastics World
51, No.5, May 1993, p.54
JEWEL-LIKE COLOURS

Diamond Graphite colours developed by Eastman’s colour laboratory are said to offer a new dimension in rich, jewel-like hues and metallic effects with a silky, shimmering finish. The deep lustre is attributed to the use of graphite in the formulation. The colours will be available for all of the company’s resin systems, which include cellulosics, PP and thermoplastic polyesters. Colour samples are offered. This abstract includes all the information contained in the original article.

EASTMAN CHEMICAL CO.
USA

Accession no.478123

Item 427
Polymers Paint Colour Journal
183, No.4325, 24th March 1993, p.148-9
ROAD TO ENVIRONMENTAL SALVATION - PHOSPHATES AND BORATES
Klugman W
Landers-Segal Color Co.Inc.

The evaluation of a variety of pigments is undertaken, selected as possible candidates to replace chromate-based pigments in protective coatings formulations. A blend of zinc phosphate and zinc borate, marketed as Wacor, was tested in an alkyd system with 4 competitive anti-corrosive pigments. Test results are given indicating its suitability as an environmentally acceptable alternative to strontium chromate.

USA

Accession no.474819

Item 428
Plastics World
51, No.3, March 1993, p.40-4
BRILLIANT NEWCOMERS OFFER SPECIAL EFFECTS, NO METALS
Lodge C

A review of recent developments in pigments and colourants is presented. Suppliers are targeting formulations that provide higher pigment loadings and improved dispersion aids, and new products that tout better colour strength, heat resistance, weatherability and processability are much in evidence. The search continues for acceptable alternatives to heavy-metal-based pigments and colourants. The popularity of special-effects colourants continues and products contest for these markets, with photochromic, thermochromic and "speckled" colourants being launched.

USA

Accession no.473838

Item 429
Polymers Paint Colour Journal
183, No.4324, 10th March 1993, p.112
METALLIC PIGMENTS FOR ECOLOGICALLY COMPATIBLE COATING SYSTEMS
Besold R
Eckart Werke AG

Due to the increasingly stringent regulations requiring the use of environmentally friendly water-based and powder coatings, descriptions are given of pigments for formulating metallic-pigmented special effect coatings. Brief details are given of aluminium pigments for aqueous coatings including Stapa Hydrolac, Stapa Hydroxal, Stapa Hydrolux, PCR aluminium pigments and polymer-coated aluminium pigments. Metallic pigments for powder coatings include aluminium powder PCR, polymer-coated aluminium powders and flake-shaped zinc pigments. 1 ref.

EUROPEAN COMMUNITY; GERMANY; WESTERN EUROPE

Accession no.473580

Item 430
Polymers Paint Colour Journal
183, No.4324, 10th March 1993, p.106
DOES THE EC NEED TO BAN THE USE OF CADMIUM PIGMENTS?
Bridge K
Gabriel-Chemie UK

The problems facing pigment manufacturers due to the possible banning of cadmium pigments, is discussed. The benefits of cadmium are briefly mentioned. Alternatives include complex organic ingredients which present problems, e.g. varying properties, high prices, and difficulties of supply.

EUROPEAN COMMUNITY; UK; WESTERN EUROPE

Accession no.473579

Item 431
Modern Plastics International
23,No.2,Feb.1993,p.46-7
PEARLESCENT PIGMENT

Pearlescent pigment grades 201, 211, 221 and 231 from E. Merck can be used in the production of very thin-walled articles such as films or toy balloons. They can be compounded with a large variety of plastics and can be combined with other colourants. Combinations with carbon black or black mica are said to give interesting blue, green or gold effects without the need for other colourants. Pigment particle size distribution is 5-20 micron.This abstract includes all the information contained in the originalarticle.

MERCK E.
EUROPEAN COMMUNITY; GERMANY; WESTERN EUROPE

Accession no.469623

Item 432
Plastics Technology
39,No.1,Jan.1993,p.87-8
MANY NEW PIGMENTS

A range of new pigments introduced by Ciba-Geigy AG at K'92 show, is described. They have been introduced as more environmentally acceptable than cadmium-, lead- and dichlorobenzidene-based reds and yellows. Details are given of tradenames and specific properties and also novel 'solid solutions' of pigments in a quinacridone pigment matrix, providing a means of attaining new shades and combinations of properties.

CIBA-GEIGY CORP.
SWITZERLAND; WESTERN EUROPE

Accession no.467190

Item 433
Hazardous Substances
4,No.1,Jan.1993,p.14-5
KNIVES OUT FOR CADMIUM

The Environmental Protection (Control of Injurious Substances No.4) Regulations came into force on 1st January 1993 and implement an EC Directive on cadmium. Details of the Directive are outlined, and a summary is given of the DEnv Pollution Paper 17 Cadmium in the Environment and its Significance to Man, which describes the occurrence of cadmium, its production, use and disposal, how it occurs in the environment, its uptake by humans, animals and plants, and its effects.

UK,DEPT.OF THE ENVIRONMENT
EUROPEAN COMMUNITY; UK; WESTERN EUROPE

Accession no.464236

Item 434
Kunststoffe German Plastics
79,No.11,Nov.1989,p.64-6
CADMIUM IN THE PLASTICS INDUSTRY
Toetsch W
FRAUNHOFER-INSTITUT FUER SYSTEMTECHNIK

(For German version see Kunststoffe, 79, No.11, Nov. 1989, p.1209-12). This article discusses the use of cadmium compounds as stabilisers and pigments in plastics products and considers possible replacement materials for these carcinogenic compounds. Calcium zinc compounds are said to be promising replacement stabilisers. Various alternatives for cadmium pigments are outlined. Statistics on the consumption of cadmium stabilisers and pigments in West Germany are included. 17 refs.

EUROPEAN COMMUNITY; WEST GERMANY; WESTERN EUROPE

Accession no.405259

Item 435
Plastics News(USA)
2,No.25,20th Aug.1990,p.4
AMPACET REPLACES 3 HEAVY METAL PIGMENTS
D'Amico E

Ampacet is reported to be replacing three heavy metal pigments with organic colourants for plastics processing in a direct response to environmental pressures and requests from customers. The three new concentrates match the colour of their predecessors and can be formulated in an LDPE/LLDPE blend for compatibility with LDPE, HDPE and LLDPE. Details are given.

AMPACET CORP.
USA

Accession no.404123

Item 436
Plastiques Flash
23,No.202,May-June 1987,p.41/55
French
HOW TO SELECT A COLOURANT

This detailed review covers thermoplastics and thermosets, together with the various types of inorganic and organic pigments and dyes suitable for use in a wide range of plastics. Guides to the use of red, orange, yellow, green, blue, and violet pigments and dyes are presented in tabular form. The use of colourants in powder, liquid and masterbatch forms is discussed. The production of metallised, mother-of-pearl, and fluorescent effects is considered. Heat-resistance temperatures are tabulated.

FRANCE

Accession no.346403

Subject Index

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The above prices do not include VAT. Customers in EU member countries may be liable to pay VAT if their Registration Number is not supplied. Please enter your EU Registration Number (VAT - BTW - IVA - TVA - MWST - MOMS - FPA) below:

VAT Number:

Rapra Technology Limited
Shawbury, Shrewsbury, Shropshire SY4 4NR, United Kingdom
Tel. +44 (0)1939 250383 Fax: +44 (0)1939 251118
E-mail: documents@rapra.net

❑ **Remittance enclosed**
(use only for opening or renewing annual deposit accounts)
(If paying by cheque, please make payable to Rapra Technology Ltd. in £ Sterling/US$/Euros via UK banks only or make payment direct to Account No: 05625025, Sortcode: 55-50-05, National Westminster Bank Plc, 8 Mardol Head, Shrewsbury, Shropshire, SY1 1HE, UK)

❑ **Please invoice my company** *(use only for opening or renewing annual deposit accounts)*

❑ **Please deduct from my annual deposit account** *(use this option when ordering documents if you already have a deposit account)*

Account Number _____

❑ **Please charge my credit card**

American Express / Visa / Mastercard *(delete as appropriate)*

Card Number:

Signature: _____ Exp. date: _____