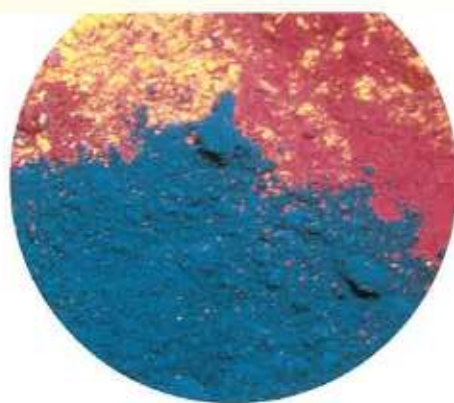
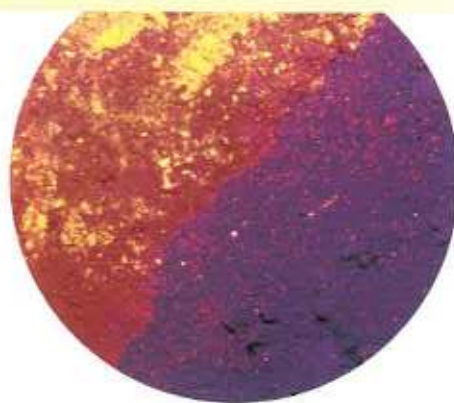


Pigments I: Roundtable



Organic Pigments Provide Value and Performance

by **Cynthia Challener,**
JCT COATINGS TECH
Contributing Writer

Pigments not only play an important role in determining the look and style of paints and coatings but also are one of the most value-added components of these materials. Despite this fact, the slow growth of the paints and coatings market, downward price pressures from low-cost offshore producers, and potential consolidation together make for a challenging environment for pigment manufacturers. Analysts predict, however, that prices for high-end organic and specialty effect pigments should begin to increase soon.

Style and durability determine the application of different types of pigments in paints and coatings. Organic and specialty effect pigments, which offer brilliant colors and interesting effects, and also tend to be more expensive, find application in coatings for the automotive and broader OEM markets as well as in consumer goods, particularly electronic products such as cell phones and computers. Inorganic pigments, which offer

durability and typically are less expensive, go into paints used for architectural and industrial applications.

The global end use market for pigments, including colored inorganic, colored organic, white, and specialty effect pigments, is estimated to be approximately \$9.5 billion in 2004, up from \$8.6 billion in 2001, according to Michael D. Brown of The ChemQuest Group, Inc., a management consulting firm located in Cincinnati, OH. White pigments are the largest segment with 52% of the market, followed by colored organic pigments at 26%, and specialty effect pigments at 13%. Colored inorganics account for the remaining 9%.

ChemQuest reports that organic pigments on a global basis have experienced an average annual growth rate of approximately 3% per year, rising from \$2.23 billion in 2001 to an estimated \$2.44 billion in 2004. One industry expert believes the ChemQuest numbers are too high. He puts the global organic pigments

Above photos courtesy of Sun Chemical Co.

market at \$4.3 billion, with the paint and coatings sector accounting for 35%, or \$1.5 billion. He notes that while the annual volume growth rate for organic pigments has been about 3%, pricing declines have resulted in reduced growth in the value of the market.

In the North American market, the volume of the synthetic organic pigment market is estimated by Steven Nerlfi, of Kusumgar, Nerlfi & Crowney, a market research firm, to reach 26.5 million pounds valued at \$350 million. He pegs the growth rate for this sector at 2% per year, with 2001 figures at 25 million pounds and \$330 million. Nerlfi notes that five companies account for 80% of the sales, while an additional 10 or so smaller firms make up the balance.

All pigment producers face several significant challenges for maintaining the growth of their businesses. "Suppliers of pigments to the paint and coatings market are dealing with an industry that has demand growth aligned with GDP," says Mr. Brown. "Pigment producers must therefore constantly shift resources and efforts to identify sectors within the paint and coatings marketplace that have higher growth potential," he continues.

Several increasing cost pressures are also affecting pigment manufacturers. Rising energy prices have eroded margins because at this point producers have not yet been able to recoup these costs, notes Mr. Brown. Pressure from offshore producers has also been steadily increasing. Organic pigments have felt the impact of this trend most strongly, largely because the price drop has been more drastic for organic as compared to inorganic pigments. "Overall, pigment suppliers must deal with a slow growth market in addition to both macro and microeconomic issues," says Mr. Brown. However, he does expect prices to rise soon, as organic pigments are one of the highest value

components in paints and coatings. "Organic pigments provide colors that cannot be duplicated with other pigment types, and suppliers are looking to receive compensation for the value-add they offer." In addition, Mr. Brown adds that capacity shortages will help to drive prices up in the future.

Another positive for organic pigments is the significant amount of

Major Suppliers of Organic Pigments

BASF
Ciba Specialty Chemicals
Clariant
Delta Colours
Sun Chemical

investment in R&D that is occurring. "Organic pigment manufacturers are working hard to push the technology envelope," according to Mr. Brown. "Pigment suppliers are at the 'gamut' or edge of the color space, and are making significant efforts to achieve high color saturation that will provide brilliance without gray or white undertones," he explains. In addition, current R&D efforts are aimed at improving the durability of organic pigments at the gamut. Typically the organic chemicals that offer the desired brilliance are much more sensitive to degradation. The challenge is to develop chemical technology that provides for the color saturation and brilliance in a durable pigment.

An emerging technology in architectural paints and coatings for both interior and exterior surfaces revolves around pigmentation designed for reflection of energy with the purpose of providing an insulative effect. In interior applications, where both pigments and fillers are used to achieve the effect, the paints are designed to retain heat in a room. The current major exterior application is on rooftops, espe-

cially in urban areas. Roof coatings that include pigments for light reflection help reduce the heat load on buildings. Some of the coatings include color pigments that can both reflect the light and provide tinting.

No major changes are expected in colors and styles for automotive coatings, which is the largest market for organic pigments. According to Robert Daily, color market manager with Dupont Performance Products, the traditional colors will remain popular with consumers for the next year. "One minor change we have observed is the return of blue to the North American palette," Mr. Daily notes. "For the past 10 years, green has been very strong, but blue seems to be becoming more attractive recently."

How do the manufacturers themselves see the organic pigments market playing out? JCT discussed the topic with representatives from several of the leading producers. They are focusing on meeting the needs of their customers as a way to stay competitive in a challenging market. Comments are presented below from Werner H. Peter, business director, performance chemicals for coatings, plastics & specialties, with BASF Corporation; Dr. Elie Saad, business director, functional chemicals with Bayer Chemicals; John Zambounis, head of industrial and decorative coatings for Ciba Specialty Chemicals; Nathan Kartszez, technical sales, plastics and Bill Bunker, technical sales, coatings with Delta Colours; and Bob Schweitzer, general manager, coatings business unit, performance pigments with Sun Chemicals.

JCT: *What are the key trends and issues in the market for organic pigments used in paints and coatings?*

John Zambounis, Ciba: Customers are demanding solutions rather than just pigment products.

Global End Use Market for Pigments

Pigment Type	2001 (\$MM)	2004 (\$MM)	CAGR
Colored Inorganic	800	874	3%
Colored Organic	2,235	2,442	3%
White	4,500	4,900	3%
Specialty Effect	1,065	1,287	7%
Total	8,600	9,503	3.5%

Source: The ChemQuest Group

Technical assistance, color matching, and other support services are as important as the pigments themselves. There is also a need for innovation that will provide a sustainable competitive advantage to our customers.

Bob Schweitzer, Sun Chemicals: In addition to addressing increasing regulatory pressures, the global organic pigment business continues to operate in an over-capacity environment where the vast majority of the newer facilities have been built in China and India.

Werner H. Peter, BASF: Asian suppliers are here and are working to improve their quality. Traditional pigment producers, however, still have an advantage in the level of technical support they provide. Everyone in the market knows that there are few "drop-ins" for the higher performance pigments, and a high degree of technical support is therefore required. A lack of support can be a risky venture that ultimately proves to be more costly. Asian suppliers also need to be judged on their policies concerning ecological aspects of manufacture. We all have to make up our minds about what kind of world we want to live in.

JCT: Based on these trends, what would you say are the major challenges you face as producers of organic pigments for these applications?

Werner H. Peter, BASF: The single largest challenge for established organic pigment manufacturers is making the better value provided more transparent to customers. A

pure dollar per pound selling approach will neither help them grow nor give the customer a sustainable competitive edge.

Bob Schweitzer, Sun Chemicals: I would add that the

organic pigment industry needs to provide products that meet the ever-increasing performance demands of the coatings industry and do so in a cost efficient manner.

Bill Bunker, Delta Colours: Dealing with companies that are bringing in unlicensed products into the marketplace is a challenge for us. Developing higher quality products—such as those with good dispersion properties and long life for outdoor applications—at a lower cost is also a hurdle that must be overcome.

John Zambounis, Ciba: Meeting the environmental and performance requirements of our customers in a cost-efficient manner. Cost efficiency is a matter that has to be considered in relation to the value that a pigment brings to the entire coating process.

JCT: How does your company plan to respond to these challenges and opportunities?

Nathan Kariszes, Delta Colours: The key to success for Delta Colours is in responding to our customers' needs and providing value-added services. We offer custom blending of organic pigments with inorganic pigments in order to get value out of the less expensive inorganic pigments and the chromaticity out of a small amount of the more expensive organic pigments.

Bill Bunker, Delta Colours: In general we focus on adding value for our customer. Organic pigments can be very difficult to handle, so we offer assistance with ease of use issues for customers. At Delta we stress

technical support and have analytical labs, for product development and testing, and we also offer custom packaging services. Especially with the increasing amount of off-shore production of pigments, customers need their distributor to provide a lot more than just delivery of pigment products.

Elie Saad, Bayer Chemicals: We will respond to these challenges by continuing to offer innovative solutions that help solve customers' problems.

John Zambounis, Ciba: At Ciba we are developing higher value products at more competitive prices as well as differentiating our pigments business through the introduction of novel chemistries, opening new color spaces, and offering flexibility to the stylists and formulators. We offer not only products and processes, but also services including Ciba® Colibri™ QuickMatch, Ciba® Colibri™ Pro color matching software, Colibri Networks support services and extensive colorant expertise.

JCT: What have been the most recent advances in the technology of organic pigments for paint and coating applications?

Elie Saad, Bayer: Major developments in organic pigments include cleaner, easier to dispense and disperse systems. Given that water-based coatings and paint systems are becoming more critical due to environmental concerns, organic pigments such as the Bayer Chemicals Aquasol® and Solfort® products that are compatible with such systems are also gaining in importance.

Werner H. Peter, BASF: There have been two specific advances in organic pigment technology in the last few years: Stir-In technology and "Hybrid" pigments. Many of our customers in the architectural market in North America have asked about a way to incorporate

color into house paint without all of the trouble associated with grinding. BASF's Xfast™ technology is an innovative answer that allows the dispersion of pigments without using much energy and without requiring a vast knowledge base in surfactant and pigment chemistries. The second innovation that has come to the market is using inorganic pigments along with organic pigments, not simply as a blend, but co-finished together to give excellent hide and durability along with excellent chromaticity. Co-finished pigments called Paliotans, offer the best of both worlds. BASF's advantage is the fact that no other supplier can provide such a wide variety of both organic/inorganic technology in-house.

John Zambounis, Ciba: There have been several recent advances in the technology of organic pigments. We now have higher quality (e.g., heat and weather stability) pigments combined with high value (e.g., opacity, chroma, color strength) and greater environmental compatibility (suitability for high-solids and waterborne systems). New chemistries have also made it possible for organic pigment manufacturers to enter new share and application areas inaccessible in the past.

Bob Schweitzer, Sun Chemicals: In addition to the improvement of pigment performance in all types of water based system, the development of low rheology pigments for high solids OEM systems continues to play a very important role in organic pigment advances.

JCT: *What noteworthy organic pigment products have been introduced recently for the paint and coatings market? What makes them novel?*

Elie Saad, Bayer: We have recently introduced the first granulated organic pigment to the industry. Due to its low-dusting properties, it is more easily dispensable. These

granulated pigments also help to reduce grinding times in production, thereby yielding additional savings to the end user. Combining our colorants operations in North America with our Borchers additives under the Functional Chemicals division gives us further advantages in that we are now able to offer the end

John Zambounis, Ciba: Ciba® Irgazin® DPP Red Ultra Opaque is a completely novel, high-performance opaque bluish-red pigment for automotive, coil, and powder coatings. With its high color strength and excellent opacity, this pigment extends the color range of high-performance opaque pigments and opens up new options for styling in the bordeaux shade area. In addition, this pigment has outstanding weather fastness, comparable with that of Ciba® Irgazin® DPP Red BO. Ciba® Irgazin® Green 2180 is a new addition to the Irgazin 2000 series of pigments for high-value industrial and decorative coatings. The new pigment extends the range of colors that Ciba Specialty Chemicals can offer customers. The product is suitable for numerous applications for which green is very popular, including trams, trains and other vehicles, architectural coatings, and agricultural and construction equipment.

Bob Schweitzer, Sun Chemicals: Among the new products that we have introduced in the recent past, the most significant is a line of dry dispersions designed for solvent based paints. These Surpass™ dispersions are unique in that they virtually eliminate the need for the milling of pigments, resulting in faster throughput and lower costs in the paint production line. We have also brought to the market two easily dispersible, highly transparent pigments for automotive coatings. One is a Perylene Red (R179) and the other is a Quinacridone Magenta (R122).

Werner H. Peter, BASF: Over the past 10 years BASF has launched more than 40 new organic and in-

organic pigment technologies. The most notable advances have been in Perylene and Indantrone high performance pigments. These advances are seen with respect to transparency, rheology, and stability.

JCT: *Have there been any major investment activities that have impacted the organic pigments market?*

Elie Saad, Bayer: In addition to updating our plants to allow for the commercial production of our granulated pigments, investments have been made in R&D.

John Zambounis, Ciba: Ciba Specialty Chemicals purchased Sun Chemical's line of perylene pigments, making it the only pigment supplier to offer customers all four transparent red pigment chemistries—perylene, quinacridone, diketo-pyrrolo-pyrrole (chemistry invented by Ciba), and anthraquinone. Ciba can now offer color stylists a full range of creative and innovative effects. Ciba Specialty Chemicals has installed a new production line to increase capacity for its high-performance diketo-pyrrolo-pyrrole (DPP) pigments at its Monthey, Switzerland facility. These pigments are used for automotive and industrial coatings, inks, plastics, and sophisticated electronic applications, such as color filters for liquid crystal displays. The additional capacity will allow Ciba to produce pigments for new applications in these sectors.

Bob Schweitzer, Sun Chemicals: Our acquisition of Bayer's High Performance Pigment business in 2003 represented a very significant investment in terms of capital and dedication to the HPP business for Coatings. The purchase placed us squarely in a leadership position in this arena. The acquisition included a state of the art production facility in South Carolina, to which we have already added more production capacity to meet our growing demand for product. ■