



EUROPEAN

COATINGS SHOW 2019

daily 2

The Show and Conference Daily 2 – www.european-coatings-show.com – 20 March 2019

THE PLACE TO BE

European Coatings Show gets off to a great start



The selfie wall was popular among visitors.

The fifteenth instalment of the European Coatings Show opened its doors yesterday morning to large crowds of visitors eager to get in.

Visitors from all over the world travelled to Nuremberg to learn about the latest innovations in the coatings industry, network with clients and suppliers and forge new contacts. Very popular, too, were the product presentations and the start-up area – a new feature at the ECS where small start-ups have a joint stand.

For the next couple of days, the European Coatings Show is once again the place to be for the international coatings industry. "The first day is off to a great start and the floor is buzzing", said Amanda Beyer, director event management at Vincentz Network. "The coatings industry is coming home."

MORE INTERNATIONAL THAN EVER

The ECS is proving to be more global than ever in terms of both visitors and exhibitors. "Just today we had visitors from

over 110 countries here to learn about the latest trends in the coatings industry," said Alexander Mattausch, exhibition director at Nürnberg-Messe. "The list of exhibitors includes 48 companies, a big increase compared to last time", Mattausch added. "The front-runner among the international exhibitors is China, followed by Italy, the Netherlands, the UK, and then the US and India." And, with 1,157 companies showcasing their products, the ECS has set a new exhibitor record.

SECOND CONFERENCE DAY – A TOTAL SUCCESS

The second day of the European Coatings Show Conference kicked off with sessions on adhesives and sealants, construction chemicals, polyurethanes, protective coatings, testing and measuring, and architectural coatings. Topics covered in the afternoon included epoxy coatings, and TiO₂ and opacification. The European Coatings Show Conference thus drew to a close – with about 780 attendees – it was once again a huge success.

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DECORATIVE COATINGS

“COMPLIANCE WITH REGULATORY STANDARDS IS A HIGH PRIORITY REQUIREMENT”

Binders play an important role in the decorative segment – a market with increasing demand for eco-friendly solutions



Micol Martinelli
Icap Sira
Hall 7, Stand 7-530

In recent years, sustainability and bio-based have become very interesting issues in the industry, especially in the decorative coatings segment. Micol Martinelli, sales manager coatings and marketing manager at Icap-Sira, says the rising number of conferences and scientific articles on these topics follows a general trend. But according to her, it will only remain a trend until genuine awareness sets in.

Where do you see current trends in decorative coatings? We are active in the production of water-borne emulsions for various sectors, like decorative, wood, architectural and construction. Binders play an important role in the formulation and we see in the market rising demand for emulsions with a lower solvent or

plasticiser requirement that will enable VOC emissions to be lowered in compliance with EU standards. Compliance with regulatory standards on emissions is a high priority requirement, not only in the decorative sector, but also in other sectors such as wood and industrial coatings.

Which functionalities are especially sought after? The market for water-borne coatings is growing, also thanks to the environmental issues, and there is demand for more sustainable, high-performance formulations. Breathability and elasticity of a paint are very important characteristics, along with high resistance to chemical agents. We currently offer styrene-acrylic binders that can be used on multiple substrates and provide excellent washability and scrub resistance.



Source: maramicado - stock.adobe.com

How important are sustainable or bio-based options in the sector? In recent years, sustainability and bio-based have become very interesting issues in the coating sector and we can

see an increasing number of conferences and scientific articles on these topics. However, our impression is that this interest is still more of a trend and not the result of any genuine awareness of the

issue; in any case, shifting to bio-based products will incur higher costs which the market should be prepared to accept in order to allow this evolution to proceed.

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VOICE

NEW TO ECS?



Antón De Castro
Lehigh Technologies
Hall 9, Stand 9-267

Please describe your company in a few words. How is your enterprise related to the paint and coatings industry? We are a specialty chemicals company that produces highly engineered, versatile raw materials called micronized rubber powder. We

transform end-of-life tires and other post-industrial rubber into micrón-scale powders that can replace oil- and rubber-based feedstocks in a wide range of applications including coatings, adhesives and construction materials. In October 2017 we became part of the Michelin Group as part of the new business unit “High Technology Materials”. This group is committed to sustainability under their “4R” strategy and we are now an important part of implementing the “recycling” component of the group’s sustainability commitments.

What products will your company present in Nuremberg? At the ECS we will be presenting our product line “MicroDyne” which is presented in a range of particle sizes—from 830 microns to 75

microns—to fit a wide array of applications. It provides improved performance attributes, such as water resistance, energy savings, durability, flexibility, sound dampening, heat absorption and vibration dampening, significant cost savings over virgin raw materials and a sustainable raw material that helps customers achieve corporate goals.

What are you looking forward to doing/seeing at the ECS? We are looking forward to our participation in the ECS where we expect to establish new networking relationships to show the benefits of “MicroDyne” as well as possible collaborations with other specialty chemical companies to develop future solutions that cover the needs of the industry.



Source: Hadjaneblia - stock.adobe.com

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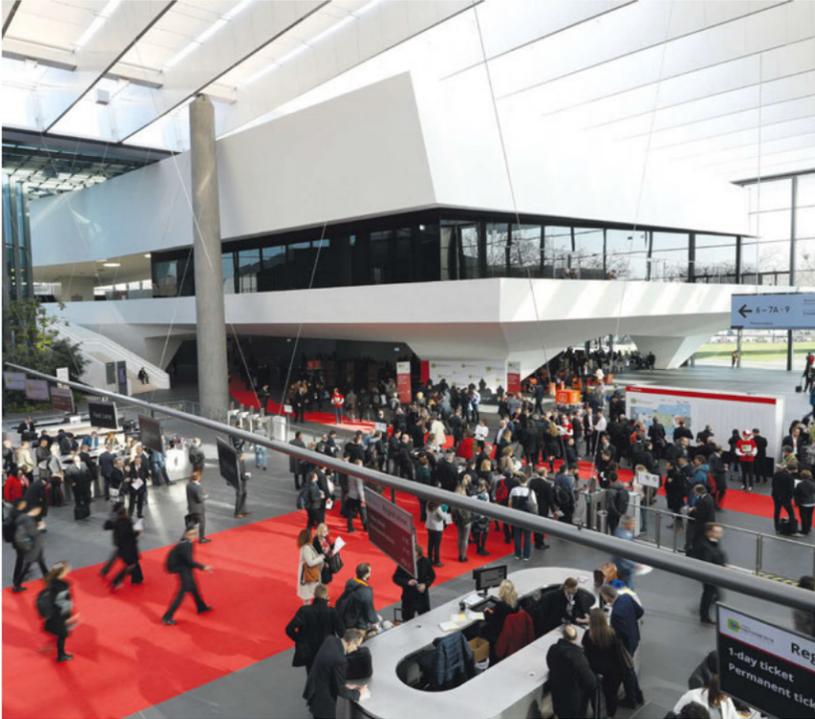
EVONIK

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IMPRESSIONS

COLOURFUL INSIGHTS INTO ECS DAY 1

Source: Helko Stahl (7)



The crowds are eager to get in



Exchanging expertise



Exceptional displays



It's all in the detail



Colourful speedracers



Surfaces that inspire



Talking about the latest production technology

CONFERENCE WRAP-UP

IT'S ALL ABOUT EFFICIENCY AND QUALITY

Water-borne and sustainable solutions remain dominant topics

Attendees looking for **THE new trend in coatings formulation were in for a "disappointment": this year's European Coatings Show Conference proved once again that water-borne technology and sustainable solutions remain in the focus of the coatings industry.**

However, it's no secret that the focus in coatings labs was and is on improving efficiency and quality during the transition from solvent- to water-borne systems, on further reducing the VOC content in organic coatings and on dealing with harmful sub-

stances and their regulations – all of them topics which found plenty of space on the conference programme.

A well-balanced blend of about 140 presentations from industry and academia attracted a pleasing number of roughly 780 attendees to the industry's foremost coatings conference that ended yesterday. Among the crowds flocking to the 24 sessions, which were organised on the basis of coatings applications and types of raw materials, there were professionals from 55 countries.

While the by-now traditional session "Science Today – Coatings Tomorrow" looked at the future

of potential coating developments, such as new bio-based polycarbonates as novel coating materials (University of Bayreuth) and the prospects for self-assembly in functional films and coatings (University of Strasbourg and Institute Charles Sadron and CNRS), other sessions were more applications-oriented.

In the well-attended session on polyurethanes, Dr Joachim Petzold of Covestro updated his audience on the safe use of PU-based coatings. He talked about the proposed usage restriction for diisocyanates under REACH and explained the difference between substance restriction and substance authorisation. Fur-

thermore, he introduced a PU hardener with an ultra-low monomer content.

Scott Brown of Lonza presented new preservation options for coatings formulations that drew a lot of attention. The interest shown comes as no surprise, bearing in mind the ongoing discussion on EU labelling and the biocide regulation.

"We shouldn't use solvents if we don't have to", stressed Anthonie Stuiver of Akzo Nobel in his paper on foam-based wood stains.

Presentations on water-borne technology featured new additives (Byk, Angus, Elementis) and binders (Dow Chemical, Allnex, Lubrizol), among others. In many



Dr Joachim Petzold of Covestro updated his audience on the safe use of PU-based coatings.

other papers, sustainability was the buzzword, e.g. sustainable innovations for architectural paints (University of Sao Paulo) and bio-based PU multi-material adhesive solutions (Croda).

A separate session was dedicated to "Foulprotect", a joint research

project which aims to develop biocide-free cleanable coatings for maritime applications.

Further interesting topics rounding off the programme included powder coating, UV curing, printing inks and construction chemicals. ◀

EXHIBITORS' VOICES

BUSY FROM THE START



"The visitors are interested in the latest developments in sustainable and logistically optimised packaging. We are demonstrating the superior potential of flexible packaging over anything that is rigid."

Andreas Reuter, ACC Beku



"We are excited about our new look and new design. So far, we have received positive feedback and I'm looking forward to a great exhibition and fruitful discussions."

Dr Gerd Bergmann, Nordmann



"The ECS is a great confluence of several products, companies and countries. It's one forum that I would like to continue supporting."

Nirav Banker, Gantrade



"We are very pleased so far and had a lot of customers as soon as the doors opened. We are getting very good feedback about our exhibits and the colourful design of our stand, which has 'city of sustainnovation' as its theme."

Dr Berta Vega Sánchez, Covestro



ECS GOES SOCIAL MEDIA

The European Coatings Show is also active on multiple social media accounts. During the show we will regularly post information, tips and more on Instagram, Facebook and LinkedIn.

You can also be part of the ECS Online community.

Just use the Hashtag #ECS2019

www.facebook.com/EuropeanCoatingsShow

www.linkedin.com/showcase/ec-show

www.instagram.com/europeancoatingsshow

PRINTING INKS

HEALTHY INKS FOR SOPHISTICATED PACKAGING

Importance of PVB inks in packaging printing is increasing worldwide. By Dr Michael Frank, R&D manager Europe in the business unit PVB at Kuraray



Dr Michael Frank
Kuraray Europe
Hall 1, Stand 1-454

The market for packaging printing is growing worldwide and with it the demands placed on packaging inks. The future belongs to environmentally-friendly PVB ink systems, because they are harmless in food packaging and deliver brilliant results precisely where other printing systems reach their limits. At

the same time, PVB inks offer additional advantages.

According to a recent study by the VDMA (Verband Deutscher Maschinen- und Anlagenbau - Mechanical Engineering Industry Association), global turnover for packaging printing is rising by more than five percent annually. At the same time, the demands placed on printing inks by consumers, industry and legislators are growing. We at Kuraray, as one of the world's leading specialty chemicals manufacturers and suppliers to the printing ink industry, are observing two major trends: increasing awareness of environmentally-friendly and harmless inks, and a growing demand for customised special inks. Polyvinyl butyral (PVB) ink systems, such as those based on our PVB resin "Mowital",

offer advantages that support both trends.

HARMLESS INKS FOR FOOD PACKAGING

In the area of food-packaging printing, consumer protection groups keep demanding that polyvinyl chloride-(PVC)-based inks be avoided. This is because their possible contamination with residual monomers means that they could trigger allergies. Many food companies and discounters are therefore already setting themselves high standards for the packaging of their products. After Switzerland, we now expect the German Printing Ink Ordinance to place stricter demands on food packaging in the European economic area. As a result, PVB inks are set to increase in importance. They are free of harmful impurities and therefore absolutely harmless

to the consumer.

Good compatibility with other ink components is one of the reasons why food-packaging printing is already one of the most important application areas for PVB ink today. Thanks to its outstanding properties, it supports durable print on demanding packaging applications. Modified PVB printing inks are resistant to heat and steam treatments, e.g. for sterilisation packaging. In microwave ovens, PVB inks do not generate any harmful emissions and are completely safe for ready-meal packaging.

ADVANTAGES FOR DEEP-FREEZE PACKAGING

PVB inks are also advantageous for deep-freeze packaging. Unlike nitrocellulose (NC) inks, for example, they remain softer and more flexible at very low

temperatures – without the addition of plasticisers. At the same time, they meet the high standards for pet food packaging. PVB ink systems also have a number of special qualities in the market for specialty applications. Demands placed on the design of high-quality packaging are increasing, and materials such as glass and metal are being used more and more frequently. With its very good adhesive properties, PVB as a binder supports printing on many different materials, such as polyolefins, metal, cellulose acetate, polyester, cellophane, polyamide and polystyrene. PVB printing inks are also characterised by low solvent retention, good rheological properties and high resistance to moisture. They thus provide the basis for high-quality specialty printing inks, e.g. in combination with metallic pigments for label

printing, as well as for glass inks, e.g. for cosmetic-product flacons.

The growing demands imposed on printing inks for packaging are a global trend. In Asia as well as in the Arabian and African economic regions, conventional solvent-borne printing inks in packaging printing are increasingly being replaced by ethanol-borne ink systems, such as PVB inks. Due to their good applicability and competitiveness, NC and PVC ink systems are currently considered by some as still having the edge. However, rising demand for environmentally friendly and high-performance inks is permanently changing the market, with printing inks based on PVB opening up new opportunities and possibilities for packaging printing in the future. 

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WOOD COATINGS

END CUSTOMERS CLEARLY SET THE TRENDS

Ultra-high-gloss and ultra-high-matt wood coatings are in demand



Ulf Neidlein
BASF
Hall 7A, Stand 7A-523

What trends are currently influencing the wood coatings market? We spoke to Ulf Neidlein, vice president business management resins & additives EMEA at BASF.

What are the most important technical developments currently shaping the market for wood coatings? There are a number of them. One is the film market. This is being driven by the converters and the brand owners. Then there is electron beam (EB) technology, which currently has a lot of momentum behind it. One of the reasons for this is the crisis in the photoinitiator market which arose from the pressure which many Chinese producers came un-

der as a result of much stricter environmental regulations. Another key trend is that of appearance and the demand for ultra-high-gloss and ultra-matt coatings as well as soft and silky-touch effects, i.e. haptics. A perennial topic at the top of the agenda is chemical resistance, such as stain resistance. We have launched several new products onto the market that do an excellent job at protecting white surfaces against coffee and red wine stains.

Where in the wood market are soft-touch surfaces in particular demand at the moment? Our core markets are essentially flooring and, of course, high-end furniture and kitchens. I'm thinking here in particular about board and front-panel coatings. The trend is towards surfaces that bring out the structure and feel of untreated wood. Luxury vinyl tiles (LVT) offer a perfect combination of design, haptics and durability in the flooring sector. They are found a lot in dental practices, hairdressing salons and the like. In other words, wherever moisture and high wear are an issue. You'll also find them in the bathrooms of rental apartments. The new LVT technology enables very high-quality floors to be produced, some of which can be

digitally printed. This guarantees a wide range of surface finishes (soft touch) and designs. These are taking over from traditional laminates to a great extent at the moment.

Who do you think has the greatest influence on trends in wood coating at the moment – the end customers or rules and regulations? While design matters, it is clearly the end customers who set the trends. Then there is the regulation side, where we are mainly talking about REACH, product safety, sustainability and health issues. Some of these are of keeping the industry on its toes. Correct labelling plays a very important role here, the main concern being genotoxicity or carcinogenicity, all of which have surfaced in the wake of REACH and the studies performed on foot of it. Product safety and sustainability have top priority at BASF, because we feel an enormous responsibility both towards consumers and towards our employees. However, the issue of costs is also a considerable one. From the chemical industry's point of view, we need to strike the right balance. Some tests can be repeated very often until a clear statistical result is obtained. But that can also bring a technology to its knees. 

TITANIUM DIOXIDE

"THE CHALLENGE FOR THE TiO₂ INDUSTRY IS TRYING TO PRESERVE HARMONIOUS SUPPLIER/CUSTOMER RELATIONS"

Availability, pricing and classification are keeping the industry busy



Reg Adams
Artikal

Titanium dioxide has been a major topic in recent years in the industry. Recent activities in regard to a looming classification are putting it back on top of the agenda of most players in the paint and coatings industry. Reg Adams, founder of Artikal, an agency that specialises in market intelligence and publishing on TiO₂, shares his expertise on challenges, trends and the potential classification.

What are the current challenges facing the TiO₂ industry? The biggest challenge to the industry is ensuring that it continues to manufacture and sell a ready supply of TiO₂ pigment, while earning a reasonable return on its investment. For paintmakers, TiO₂ pigment is a vital ingredient in all formulations, typically accounting for at least 10 % of raw material costs and sometimes up to 15 % at times of peak TiO₂ prices, such as occurred during 2011/12. The price trend for TiO₂ has always been cyclical – more akin to a commodity than to most of the other pigments and specialty additives used in making paint. But the frequency and magnitude of the TiO₂ price cycle's oscillations have been more pronounced during the past decade than ever before in the industry's 100-year history. In terms of EUR per kilo, the average contract

price (delivered, Northwest European customer works) rose from EUR 2.20 in Q3 2009 to EUR 3.25 in Q3 2011, then fell to EUR 1.95 in Q1 2016, then rose again to EUR 3.00 in Q2 2018 before gently sliding to EUR 2.80 by the end of last year. The cost of TiO₂ feedstock (slag, rutile and ilmenite) accounts for up to 40% of a pigment manufacturer's variable costs, and purchases of TiO₂ feedstocks are usually denominated in US dollars. So the upswings and downswings of the USD/EUR exchange rate – with a high-point beyond USD 1.50 towards the end of 2009 and a low-point of USD 1.05 at the end of 2016 – can have a significant effect on the costs of making pigment. Extreme fluctuations in direct costs at one end and product-selling prices at the other end have resulted in TiO₂ pigment multinationals showing quarterly gross profit margins varying from near zero to levels in excess of 40%. Against that sort of background, investing in capacity expansion is a risky business! From the customer's viewpoint, TiO₂ pigment price volatility and sporadic warnings of product shortages, accompanied by lengthening order lead-times, can be infuriating. The challenge then for the TiO₂ industry is trying to preserve harmonious supplier/customer relations. Some pigment multinationals have been trying to frame new contract terms with their major customers, offering longer contract periods at fixed "equilibrium prices." Pitching the long-term contract price at a level that might tempt customers to sign-up will involve a lot of hard bargaining.

What will be the dominant trends in the TiO₂ segment in the near future? After two years of above-average synchronised growth in all the major market regions, the year 2018 began brightly for TiO₂ pigment

demand. However, by the middle of the year, it became clear that pigment sales growth was faltering in Europe and China, though demand remained fairly strong in North America. World TiO₂ consumption increased by an estimated 3.6 % to reach 6.7 million tonnes last year, of which Europe accounted for just under 20%. The outlook for 2019 is much more sombre: world TiO₂ demand is expected to rise by 3 % at best, with consumption in Europe more or less on a plateau. A major feature of the TiO₂ industry in recent years has been the upsurge in Chinese exports of TiO₂ pigment, from 450,000 tonnes in 2013 to more than 900,000 tonnes last year. European markets (especially Italy, Spain and Turkey) have been prime targets for Chinese suppliers and, having established a beachhead in these markets, Chinese suppliers will be keen to improve their market share here during 2019. Inevitably, the combination of stagnant demand and intensified competition will put further pressure on European TiO₂ producers. One way in which established producers are trying to respond is by stepping up their efforts to persuade major customers of the advantages of TiO₂ pigment deliveries from local sources in forms other than traditional 25- or 50-kilo bags. Trends towards greater use of "big bags" (of 500-1000 kilos) and slurries are likely to gather pace during 2019.

How do you rate the proposed classification for TiO₂ in Europe? The EU authorities responsible for setting consumer health and safety standards are seriously considering draft legislation that would require all TiO₂-containing products

sold in the EU (cans of paint, PVC window-frames, packs of decorative laminate flooring, etc.) to have labels on the packaging with words and icons warning that the product contains a potential carcinogen. The framework for such legislation is the Classification, Labelling & Packaging (CLP) Directive, which came into force in January 2009. The objective is to identify those chemicals that are potentially hazardous to human health or the environment in some way, e.g. as endocrine disruptors or sensitizers causing or exacerbating cancers, dermatological or pulmonary conditions. Responsibilities for doing the first assessments for different chemicals were assigned to different member states. TiO₂ was assigned to ANSES (the French Government agency) and, after looking at all the available biomedical and toxicological research data, ANSES published its

report in May 2016, recommending that TiO₂ should be classified as a potential carcinogen. The evidence is remarkably flimsy. The only relevant data supporting this verdict comprised two studies, in which laboratory rats developed tumours that became cancerous after living for several weeks in very concentrated atmospheres of TiO₂ dust (240 mg/m³). The validity of these studies has been challenged on many grounds: the exposure concentrations were extreme, the rat lungs were chronically overloaded and physiological clearance was impaired. Moreover, human cohort studies assessing more than 24,000 people working in TiO₂ factories have shown no association whatsoever between exposure to TiO₂ (at normal factory concentrations) and the incidence of lung cancer. Nevertheless, the law-drafting process has progressed through various committee stages over

the past 30 months and, despite well-argued opposition from TiO₂ producers and consumers, there remains a possibility that a Category 2 designation for TiO₂ will be confirmed and that cancer-warning labels on cans of paint will become mandatory by the end of 2020. This would have a number of serious ramifications. The costs of waste management could be doubled or trebled. There could be extensive impacts on energy consumption for lighting, road safety, food packaging, paper and plastics recycling, etc. Also, the enactment of legislation in the EU might set a precedent for similar regulations to be adopted in other parts of the world. Optimists believe that common sense will ultimately prevail and that politicians and their scientific advisers will drop proposals for cancer warning labels associated with TiO₂. 

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PRODUCTS ON DISPLAY

ALL THINGS NEW

The product presentations proved hugely popular yesterday

Want to get an overview of the latest products? If so, the product presentations are the right thing for you.

The product presentations are all about informing the audience briefly and concisely about the most important aspects of the new products being presented. The speakers have just 15 minutes to explain the key features to the audience, starting with the development of the new product, to its performance,

right through to the underlying technology.

Yesterday, some 60 product presentations were held simultaneously at three different stands. There was a great deal of interest in them and the seats filled up quickly. So, if you want to be at the product presentations and you'd like to have a seat, be sure to get there on time. You can go there any time you want – there is no entrance fee. Some 60 further new products will be showcased today. The presentations will take

place at three different stands in different halls, so that everyone has a chance to experience them. The first will be held at Stand 1-131 in Hall 1, the second at Stand 4-214 in Hall 4, and the last at Stand 9-544 in Hall 9. They take place this morning and afternoon and again tomorrow morning and afternoon. A detailed schedule for today can be found on pages 26.



foronachweis

VISITOR VOICES

GREAT SHOW



“We are a chemicals trader looking for partners to trade with. It’s a great exhibition, it’s very large and there are many interesting companies here. It’s a pity that the show only runs for three days, as I could spend way more time here.”

Dennis Verhallen, Anno Chemicals



“The show is very well organised; all the information is readily accessible and easy to find. A lot of international companies are here, which is great.”

Paola Galli, PMS International



“It’s my first visit to the ECS. I’m impressed with the size of the exhibition and I’m looking forward to meeting existing and new business partners.”

Asterios Tzikas, Domomat



“It’s my first time at the ECS. I am looking for new additives and ideas for our daily R&D work. The whole organisation of the show is really good and there is plenty of space for holding meetings.”

Ana Miñana, Laboratorios Argenol



5 THINGS TO DO AT THE SHOW

- Explore a city by virtual reality (Clariant, hall 7, stand 7-123)
- Have your portrait drawn in three minutes (DCC Lansco, hall 9, stand 9-351)
- Taste some popcorn made with liquid nitrogen (Sasol Performance Chemicals, hall 4, stand 4-344)
- Admire famous portraits featuring new colourants (Coloris Global Coloring, hall 7, stand 7-226)
- Have a sweet break at the chocolate pyramid (Cirkel, hall 7, stand 7-307)

COATING TRENDS AND RESEARCH

ADVERTISEMENT

An interview with Jean-Yves Loze, Research Lab Manager - Powders for Coatings Orgasol® & Rilsan® Fine Powders by Arkema

At Arkema you are in charge of the technical development of Orgasol® powders and Rilsan® powders as additives in liquid coatings, and Head of the research laboratory for Rilsan® fine powders for coatings. Do your products enter our daily lives?

It's more than likely if you sit in front of a laptop, for example, its surface may have a matte black appearance with a velvety effect. This is exactly what our Orgasol® texture agent is able to generate in addition to other performances (non-greasy touch, powdered finish ...). If you're in your car, there's also a chance that our ultrafine polyamide powder will make your dashboard as soft to the eye as it is to the touch while resisting UV and heat attack. And if you look at the seals of the side windows, you will also find the presence of Orgasol® powder to reduce the coefficient of friction and noise. We can also imagine that you have furniture around you. The trend, especially in Europe, is more and more matte finishes on furniture. Wood protected by its coating must retain its natural appearance while remaining highly resistant to abrasion. Again, it may be that Orgasol® products are not far off!



With so many concrete applications that shed light on the applications of these additives, how to summarize their properties?

Orgasol® and Rilsan® fine powders are used as texturizing or matting agents. In addition to the surface modification (texture, slip or anti-slip), these additives improve the properties of use of coatings by optimizing their mechanical properties. They significantly increase their durability (resistance to scratching, abrasion, stains ...) and are also used, as I illustrated previously, to modify the sensory properties of the coating (soft or rough touch). Their ease of use make them multifunctional additives that offer a range of interesting properties for coating formulators in the fields of coil coating, can coating, etc. Orgasol® and Rilsan® fine powders are surface modifiers but they will never be used for this property alone. Our customers use them in cases where they need to make a qualitative leap in terms of surface effects and lifespan properties.

What's striking about Orgasol® and Rilsan® fine powders is their unique ability to constantly reinvent themselves. What do you attribute to this? What determines your research objectives?

The Orgasol® and Rilsan® polyamides are showing an insolent youth, as they celebrate their 30th and 70th birthdays, respectively! It is linked to their exceptional potential. What is quite impressive, for example, with the Orgasol® range is that we are able to develop applications by regularly discovering new properties and innovative uses for these resins. They are, for example, used today in the making of LCD films for flat screens for their optical properties and their controlled morphology. We are constantly trying to improve the properties of use and durability of coatings. This does not only benefit our customers and all end users. The benefit also meets the new challenges of sustainable development: the more a coating withstands the effects of time, the more durable it is and the less the environment is impacted. In the same perspective of sustainable development, we are working on materials based on renewable raw materials that can replace petroleum derivatives. This is the case of Rilsan® bio-sourced powders, extracted from castor oil, which we seek to develop in terms of particle size and chemistry. This is one of the other important axes guiding our research, consisting of exploring the different possibilities of evolution of the chemistry of our particles, particularly from the morphological point of view to obtain interesting visual and aesthetic aspects on the coatings. This is like creating a sculpture on a micron scale. We have thus developed a unique production process in the field of morphology control of fine particle sizes up to 5 microns. Again, we want to meet the demands of our customers. That, for example, of a formulator who will challenge us on issues concerning a composite material, for which we will look for a new type of particle to obtain very regular three-dimensional properties. Automatically, Orgasol® ultrafine polyamide powders will prevail. We will try to disperse these particles in the formulation so that once applied, they deliver the maximum of their effects.

A bit like cooking, one, two or three pinches in the recipe can change the dish?

It's a pretty good analogy. Just as the change of grade plays a great deal on the final properties, we can almost infinitely adjust the texturing by measuring the «pinches» of which you speak. To give an idea of magnitude, these are just a few percent in the formulation of a coating. It is a plus for the customer who, on the basis of a simple formulation, goes through additions of Orgasol® or Rilsan® powders to obtain formulas with different effects. They can be varied very quickly. A slight variation, for example, with the Orgasol® additive, allows to go from a varnish that will be rather satin to a matte varnish with a touch effect much softer. This is true for surface properties. It is also for sustainability. One of the great advantages of Orgasol® and Rilsan® powders is also their great ease of use in the formulations: they are often incorporated at the end of the formulation because their dispersion is easy and does not lead to a thickening of the coating product.

Staying with this image of cooking, are you at the stove alongside the formulators?

This is the function of the formulators but very often, we go back a bit in the kitchen because it is important for us to know the customer's formulation if we want to be able to advise them more effectively. We can thus propose formulas of orientation. The formulator keeps their manufacturing secrets, which does not prevent us from exchanging a minimum with them on what they are looking for. This requires having a good knowledge of the other ingredients of the formulation so as not to miss out on an essential part of our job which is to know also the job of our customers. And then, it's pretty essential if we want to be sure to get the most out of our products in the formulation. To do this, we are using synergies within Arkema with our Coating Resins, Sartomer and Coatex colleagues, who are also involved in coatings. We interact with them on formulations to keep us up to date on developments and advise our customers most effectively.

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ANALYSIS

THE GLOBAL COATINGS INDUSTRY IN 2018

Volume growth of 4 % expected by 2023. By Mike Growney, Kusumgar, Nerlfi & Growney

Global coating consumption in 2018 was 45 million tons, valued at USD 141 billion (about 124 billion euros). Volume was up 3 % compared to 2017 while value in U.S. dollars was up 6 %. Dollar value grew more than tonnage owing to increased coating prices and foreign exchange rate differences. Coating price increases were fuelled by rising energy prices.

The U.S. dollar began the year weaker than most currencies when compared to 2017 but strengthened in the later part. Global coating growth has matured as the explosive growth in China has fallen to more modest levels. Tonnage is forecast to grow at a 4 % annual rate through to 2023.

REGIONAL MARKETS

The **Asia-Pacific** region leads in coating consumption, with nearly one-half of the global tonnage in 2018 (see Figure 1). Coating consumption in Asia-Pacific is now just over twice that of ten years earlier. China has been the main contributor to coating growth in the region. In 2008, China accounted for 47 % of the region's demand; in 2018 its share was 60 %. Chinese coating consumption is up 260 % since 2008. Growth has now moderated in China and a 5 % annual rate of increase is projected through to 2023. India is the second largest consumer of coatings in the region, with nearly one-quarter of the volume in 2018. Volume in India has also enjoyed a meteoric rise and is up 245 % over 2008. India's coating growth is forecast at 8 %

per year through to 2023, the highest in the region.

Japan and South Korea are among the mature coating outlets in Asia-Pacific and together took 10 % of the volume in 2018. Coating consumption in these two countries is similar to that of ten years prior when their regional share was 22 %. A mature 1 % annual rate of increase is forecast for coatings in both countries.

VOLUMES ARE EXPANDING MODESTLY

Other Asia-Pacific countries took 16 % of the volume and are growing at 5 % per year. Taiwan and Australia are the well-developed coating outlets. Coating volume in Southeast Asia countries is expanding modestly, with Indonesia, Thailand and Vietnam among the fastest growing.

Europe is the second largest regional coating market, taking 21 % of the global volume in 2018. Its share of the global market has declined from about 30 % in 2008. EU member countries comprised 72 % of the region's consumption in 2018, with recent year growth struggling to reach 1 % per year. EU coating demand is up by some 10 % over 2008, with Eastern European countries being the leading contributor to the increase. Russia and Turkey together accounted for 20 % of European volume in 2018, up from 17 % in 2008. Volume in both countries has fluctuated in accordance with economic and political developments. Tonnage in Turkey is up by some 75 % since 2008 while Russian consumption has increased by less than 10 %.

North American coating usage was up by about 1.5 % over 2017 and its share of the global total was 16 %. Tonnage is up some 16 % from 2008 when its share of global coating volume was 22 %. The U.S. was an outlet for nearly 85 % of the tonnage; Mexico comes second in terms of usage and is followed by Canada.

South and Central American countries took 7 % of the global coating volume in 2018, which is roughly the same share as in 2008. Tonnage in the region is up over 40 % from 2008. Brazil is the largest outlet, and coating demand there has grown over the last two years following a severe recession in the country. Many other countries in the re-

gion have experienced modest coating growth but some have seen declines owing to political and economic developments.

COATING TECHNOLOGIES

The following part describes the global coating volume by technology in 2018.

Architectural paints comprise 59 % of the global paint tonnage in 2018 and 40 % of the value. Water-borne paints predominate in the architectural market, with 82 % of the total volume in 2018, up from a 78 % share ten years ago. Water-borne technology has now captured some 90 % of the architectural paint market in North America and the EU. Its share in the emerging markets of China, India, Russia, etc. is lower but advancing. Growth of WB architectural paint is forecast at 4-5 % per year. The global share of WB architectural paint is projected to rise to 87 % in 2023. In contrast, solvent-borne architectural paint volume is falling in many countries and overall is growing only 1 % per year. Wood and metal are leading SB architectural paint applications.

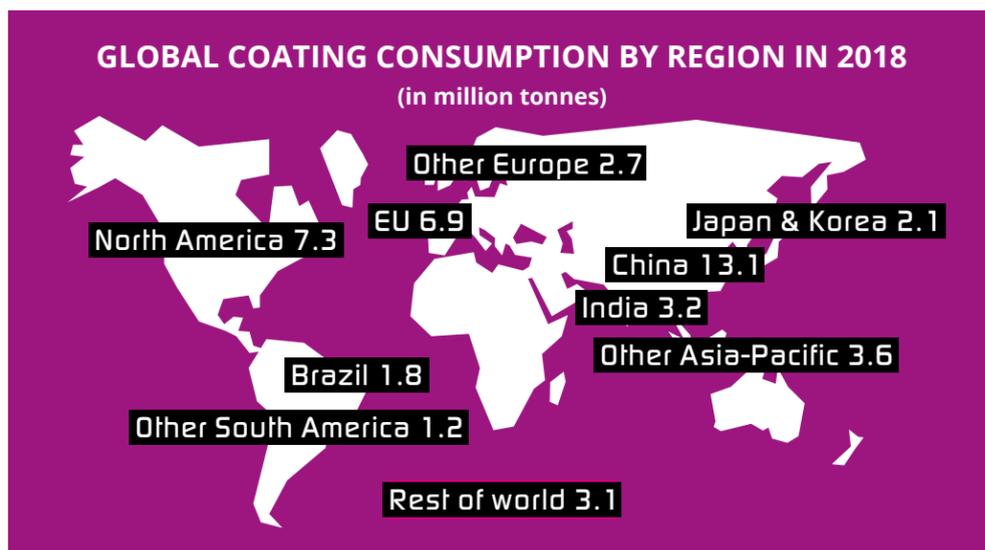
Industrial coatings include both original equipment manufacturers and special purpose coatings. They comprised 41 % of coating tonnage and 60 % of value in 2018 and are growing at a 3 % annual rate. Solvent-borne technology leads with 63 % of the industrial coating volume which is up by about one-third from 2008. Solvent-borne tech-

nology is well established in many OEM end uses which now rigorously control emissions. In many end uses, solvent content has been significantly reduced and more environmentally acceptable solvents are employed. Solvent-borne industrial coatings are forecast to increase at a 2-3 % annual rate.

Water-borne technology was one-fifth of the industrial coating volume in 2018; its share has doubled in the last ten years. Fast-growing WB outlets have included automotive OEM and refinish basecoats, wood, industrial maintenance, roof coatings, traffic paint, and aerospace. A recent large-volume convert to WB is shipping containers which are primarily manufactured in China. Water-borne industrial coatings are forecast to grow 4 % per year.

Powder coating technology is well established in industrial applications and captured 13 % of the tonnage in 2018. Volume is up nearly 80 % from 2008. China now consumes over one-half of the powder coatings. Powder coating growth is placed at 4 % per year through 2023.

Radcure technology was only 2 % of the industrial coating tonnage in 2018 and 4 % of the value. Wood and ink overprints are the larger volume outlets for radcure technology. Optical fibres, vinyl flooring, release, nail care and numerous specialty applications in electronics are among the many other outlets. Radcure technology is growing at a 6 % annual rate.



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MARINE COATINGS

“INCREASED NEED FOR COOPERATION”

Environmental regulations and technical challenges



Peter van Aken
Lonza
Hall 7, Stand 7-520

Peter van Aken, new business development director at Lonza, thinks that cooperation between industry, the academic world and start-up companies is increasingly needed to cope with the challenges imposed on raw materials for marine coatings.

In how far do environmental regulations impact R+D of raw materials for marine coatings?

Environmental regulations are critical for ensuring that products are safe, do not impact on human health or the environment and are sustainable. However, speaking as a biocide supplier, these regulations represent a significant barrier to innovation, and bringing new products to the market is very difficult. Registration costs are high and an upfront investment is required. Time to market is in the range of 7 to 10 years and there is much uncertainty because the regulatory framework keeps changing. In addition, there are technical challenges to overcome. Regulatory considerations are one of the first concerns when deciding to further investigate any new raw material offerings. Unless there is a good probability of being reasonably safe for humans and the environment, a new raw material technology will not be allocated a great deal of development time. Regulatory experts are

always brought into the planning of new raw materials very early in the development stage.

Therefore, there is an increased need for cooperation between industry, the academic world and start-up companies. Luckily, new technologies are still being introduced, but their efficacy has yet to be proven. And, whilst not all technologies are biocide-based, the potential impact on human health and the environment is unknown. Performance track records will steer ship owners' decisions and determine which solutions are viable on the market.

How can novel raw materials help to prevent corrosion in marine environments?

A wide range of factors contribute to corrosion and coating failure. While novel inhibitors play a key role in anticorrosion protection, functional additives can also enhance performance. New technologies are being developed that improve coating hydrophobicity with a view to pre-



Source: Nightman1965, Fotolia.com

venting coating damage, which essentially is the starting point for eventual coating failure and corrosion problems.

In this regard, additives that prevent fouling by marine organisms ultimately contribute to overall anticorrosion protection. They achieve this in part by stopping fouling organisms from attaching themselves to and / or growing on the coating surface, thereby preventing them from doing damage. A secondary ef-

fect is the prevention of corrosion mechanisms that can be induced by fouling.

What projects on marine coatings are you currently involved in?

We have an in-house development pipeline that draws on our wide expertise in various technologies. We have projects which can make contributions to anticorrosive paints, but we also have a very interesting project which will support the use of biocides more efficiently in

antifouling points. Via IPPIC, we are contributing to an IMO-sponsored project called GloFouling, a project which helps to implement IMO regulations for avoiding invasive species. Further, we have been participating in ByeFouling, a European Commission-subsidised project for novel antifouling technologies. New polymers for antifouling are being investigated. We have over a year of raft testing on several new polymers that perform very well compared to current self-polishing polymers. ☑

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CONSTRUCTION CHEMICALS

MOST SUCCESSFUL WITH COLLABORATION

The construction industry is influenced by many mega-trends



Andre Hugentobler
Trinseo
Hall 4, Stand 4-313

Working collaboratively with customers when developing new products is essential in the construction industry. Andre Hugentobler, global industry development leader for Trinseo's adhesives and construction binders business, explains what makes these joint initiatives successful.

What role do modern and innovative materials suppliers play in the construction industry? The adhesives and construction industry is heavily influenced by what we call mega-trends. These mega-trends are associated with population growth, urbanisation, improved infrastructure, increased quality of life, and environmental conservation. Residential and office buildings, for example, are booming everywhere. Customers are asking for products to be developed even faster. And environmental, health, and safety (EH&S) requirements are changing just as quickly. That's why modern and innovative materials suppliers are critical within the construction industry. Trinseo sets high standards when it comes to the performance of latex concrete modifiers and mortar additives for the building and construction industry. One specific project we are currently running, and where we will launch products commercially by the end of 2019, is what we call cement-based waterproofing membranes and slurries for improving the durability of building areas prone to protracted water and moisture exposure. Here we have come up with a product that improves workability and meets all the emerging environmental criteria, including ammonia-free and low-VOC. This is just one way in which we are making the industry more innovative.



Source: pigres - stock.adobe.com

Which sustainability issues do you currently consider to be the most important for construction chemicals? The market is very dynamic. There are more and more initiatives addressing what sustainability actually means in terms of the raw materials used, recyclability, or a product's total lifecycle. At Trinseo, we want to make sure that we make a product in a very efficient way that also takes account of all the environmental aspects that you associate with a product during its whole lifecycle. Sustainability is critical for the chemical industry. We will always

look at the sustainable aspects of the products that we are using, the monomers and the additives, to make sure that - if possible - we are moving into an environment of sustainability. Being sustainable and acting sustainably are not always easy in the chemical world, but we are looking for alternatives like modified biocide packages, greener surfactants, and ammonia-free solutions. In addition, we have introduced a new product range containing biomaterials. And we have also recently developed solutions that don't release formaldehyde. They are applied to fibre-based

reinforcements used in building applications. We were the first to develop these products. **Many mega-trends overlap within the construction industry. How do customers deal with this challenge when developing new products with Trinseo?** The most successful innovations are those produced in collaboration with our customers. You need to know their specific challenges so that you don't just develop a solution, but provide one that addresses their actual needs. Additionally, we are concentrating our efforts on

a limited and jointly prioritised number of high-value projects for the industry. This stops us getting side-tracked and enables winning solutions to be developed quickly for our customers. Our global adhesives and construction R&D network puts this idea into practice. We have our global R&D centre in Rheinmuenster, Germany, as well as different application laboratories in Samstagen, Switzerland; Midland, USA; and Shanghai, China. These labs work closely with each other, and are strategically located to work with our customers wherever they are.

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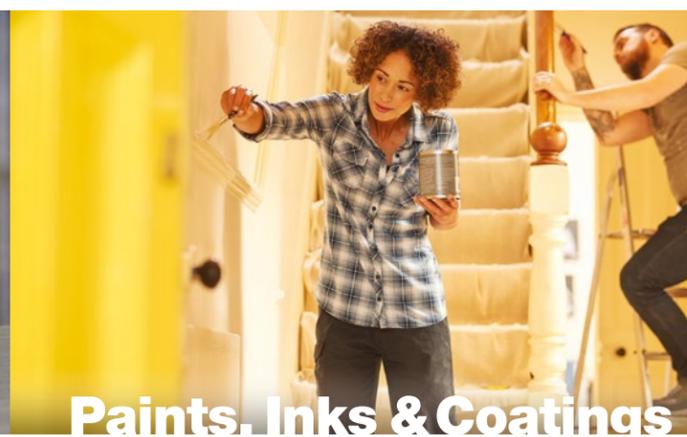
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REVIEW

SO MANY EXCITING TOPICS

The second day of the ECS Conference

This year's ECS conference ended yesterday with 12 sessions, each with six interesting presentations. The question about yesterday's highlights is not easy to answer. Below we present some of the topics that attracted our attention and are intended to give you an impression of how wide the range of topics was.

The focus was, of course, on the latest research in the various fields.

ADHESIVES AND SEALANTS

In the adhesives and sealants session Dr Jörg Tillack, Covestro, Germany, talked about a new hotmelt adhesive technology matching the performance of PU dispersions. He reported on a breakthrough in application and formulation technology for polyurethane hotmelts that allows the processing and application of very high molecular weight polyurethanes, matching the performance of heat activated polyurethane adhesives. Water-borne aliphatic polyurethane adhesives are well known for providing tough and elastic bond lines with superior hot tear strength, making them the preferred adhesive technology for highly demanding and dynamically loaded adhesive applications in automotive, furniture and specifically footwear industry. Their high molecular

weight and limited thermal stability have so far prevented their use as adhesive raw material in hotmelt application technology.

CONSTRUCTION CHEMICALS

The formation of a dry skin on fresh adhesive mortars is an undesirable side effect of polymeric admixtures that are indispensable to this type of material. Alessandra Lie Fujii Yamagata, ENS Paris Saclay, France, presented an investigation which adapted a classical interfacial rheology technique to study the rheological properties – evolution of the skin. The introduced technique and magnetic resonance imaging (MRI) were used to evaluate the effects of cellulose ether (CE) content and degree of substitution's (DS) on skin formation of mortars prepared with two types of cements. MRI results of water distribution within the sample over time indicated a dryer zone formed at the exposed surface that is dependent on CE content. Oscillatory interfacial measurements pointed out that skin's storage modulus (G') was firstly dominated by water loss, presenting smaller increasing rate with higher CE content, then an inversion occurred due to polymer properties predominance. Wind conditions accelerated the effects of CE on G' kinetics of the skin.

POLYURETHANES

An interesting presentation dealt with new elastomeric polyurethane coating made with

polycarbonate diol with intrinsic self-healing. Dr Manuel Colera, UBE Corporation Europe, talked about self-healing materials which self-repair with time once they suffer cuts. Recently, polyurethanes showing self-healing have been developed, such as those made with separate liquid isocyanate+polyol, or diamine molecule containing disulfide aromatic moiety. However, all those polyurethanes need the external agents (heat, radiation) or the time for sufficient self-healing is long. In this study a different approach is proposed for synthesising elastomeric polyurethanes which, after being cut, self-heal in less than 30 seconds at 25 °C. Furthermore, they show adhesion and have potential as smart coatings. Polycarbonate diol polyol and/or polycarbonate diol-based prepolymer were used to synthesise fully clear transparent polyurethanes. The extent of self-healing was evaluated by cutting completely polyurethane pieces by the middle, re-joining them and obtaining the stress-strain curves at different times. Irrespective of the nature and the molecular weight of the polycarbonate diol, satisfactory self-healing was obtained 30 seconds after rejoining (60% at least of the original mechanical properties).

Dr Michel Tielemans, Allnex, Belgium, talked about novel bio-based energy-curable PU dispersions. They are delivering superior coating performance



Source: Heiko Stahl

with a favourable ecological footprint. They address today's market demand for sustainable products in the perspective of a tri-dimensional model inspired by Life Cycle Analysis. Chemical innovation involves a structural approach towards new polymers with increasing bio-carbon contents that keep very high reactivity and immediate hardness after cure. This methodology guarantees a defined level of bio-carbon content according to ASTM D6866 standard. The new low-viscous products offer robust spray application with an attractive performance as a wood topcoat combining excellent mechanical & chemical resistances. More than ever, allnex is building on an environmentally-friendly product range and is painting coating innovation in green for a great sustainable future.

ARCHITECTURAL COATINGS

Glauca Buchmann, University of Sao Paulo, Brazil, presented her research about sustainable innovation for architectural paints. In this work, the envi-

ronmental impact profiles of two water-based architectural paints were compared applying the Life Cycle Assessment (LCA) methodology. Firstly, two generic non-commercial formulas of standard paint (ABNT NBR 15079) were developed: 'Paint-A' with conventional raw materials and 'Paint-B' containing some alternative raw materials, which would hypothetically contribute to a better environmental performance of the final product. Then both formulas were reproduced in the laboratory and the samples of the paints were submitted to technical performance tests. With the data obtained, the reference flows were determined to fulfill the functional unit defined by covering 36 m² of interior masonry wall by a minimum period of 4 years (ABNT NBR 15575-1). Afterwards, the life cycle of the paints was modeled and analysed in the SimaPro 8.2 software and in the LCA.

EPOXY COATINGS

A case study in the epoxy coatings session dealt with novel

low VOC, low viscosity epoxy, enabling high solids systems. Marie-Josée Dery-Chauvette, Olin Epoxy, Germany, presented their results. With increased demand to reduce emissions of Volatile Organic Compounds (VOC) the chemical and petrochemical industries are considering alternative solutions to the incumbent solvent-borne epoxy resins used as primers and mid coats. In 2015 a novel family of low viscosity, low VOC epoxies were introduced as an alternative to incumbent High Solids which typically have undesired characteristics including high viscosity, poor sprayability, and reduced corrosion resistance. In 2017, a field study of these systems demonstrated excellent performance with increased productivity for asset owners and contractors while reducing VOC content. During the trial, three systems were tested with the goal to confirm the new epoxy resin is robust enough to enable thin film, high build, and application efficiencies while performing in three-layer zinc rich, barrier systems and two-layer barrier system. ●

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PIGMENTS

“STRATEGIC ACCESS TO RAW MATERIALS WILL BE KEY TO CONTROLLING COSTS AND SECURING SUPPLY”

A closer look at the current issues in the pigments market



Milan Krumbe
Sudarshan Europe
Hall 7, Stand 7-157

Competition in the pigments market will increase and backward integration will play a more important role, according to Milan Krumbe, general manager at Sudarshan Europe. He also believes the need for joint development work will increase.

How would you describe the global pigments market? It is a growing market with an average growth rate of 4 %. APAC is still the region with the highest demand – it accounts for 45 % of market share, followed by Europe with 22 % and North America with 20 %. LATAM accounts for approximately 10 % and MEA 3 %. Inorganic pigments represent 90 % of global pigments demand and organic and specialty pigments each represent approximately 5 %. Demand for coatings applications represent 50 %, followed by plastics applications with 20 %, inks with 15 % and the construction segment with 10 %. A targeted strategy will allow higher growth rates in special application segments and regions. Consolidation and entry of new investors will reshape the supply landscape. Overall, competition will increase.

What challenges are producers of pigments facing at the moment? Strategic access to raw materials will be key to controlling costs and securing supply. The year 2018 demonstrated that manufacturers with a dual sourcing strategy were able to remain competitive. Site closures in China led to limited raw materials availability and underlined India as a competitive manufacturing location. Backward integration will play a more important role. Long term availability and access to raw materials are core topics in the market and are essential for offering constant quality at market price level. A balance between a strong backward integration position and the ability to differentiate and innovate in accordance with customer demand are key requirements.

What would you consider as current trends in the field? The architectural coatings segment



Source: iStockphoto.com

requires environmentally friendly and energy efficient coatings, such as heavy-metal-free and water-borne or low-VOC formulations. Automotive coatings is an important growing segment and imposes the highest product and application requirements. Fewer process steps and low-curing systems in accordance with colour

matching on different substrates are opportunities. Demand for high-performance pigments and segments, such as digital inks, UV inks and packaging inks, will grow rapidly. Publication gravure inks will decline. Increasing regulatory and product safety requirements are key trends and provide opportunities for differentiation.

Consumers will benefit from a higher level of food contact performance and product safety. In terms of colour popularity, trends are not changing significantly. As customers target a higher level of differentiation, the need for joint development work will increase.

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NEW TO ECS?



Iwona Szewczyk
Inchem Polonia
Hall 1, Stand 1-524

Please describe your company in a few words. How is your enterprise related to the paint and coatings industry? Our company is a manufacturer of modern construction chemicals and the leading producer of

pigment pastes reparations. The company has existed on the market for 30 years creating products for both retail customers and manufacturers. Our mostly known product is "Pigment Mix". This product has proved to be a huge innovation on the national market for many years. We are currently putting a lot of work into working on pigments preparation.

What products will your company present in Nuremberg?

We are going to present a wide range of our water-soluble products which are environmentally friendly and safe for the users (free of VOC and APEO). The next advantage is their versatility as they are able to cooperate with most of the soluble goods as well as perfectly mix with colourful base and

warrantee sustainable colour. The next product we will be happy to present is the preparation, especially made for school and children accessories. We have made every effort to ensure that the product is eco-friendly, safe to use and adheres to EU - EN-71-3 safety standards for the final client.

What are you looking forward to doing/seeing at the ECS? We are glad that as an exhibitor we will have the opportunity to get to know our potential business partners. We aim to fulfil our vision of being the leading supplier for industrial painting producers. We believe that our company, through long experience and constantly developing offer, will attract the great interest of the ECS participants.



Source: iStockphoto.com

POWDER COATINGS

EXCITING TIMES FOR POWDER COATINGS

New applications and trends



Gunjan Khanijow
Olin Epoxy
Hall 4, Stand 4-262

There are many new avenues to explore for technical developments in the next three to five years in powder coatings, says Gunjan Khanijow. The global strategic marketing manager at Olin discusses the latest trends and the lowering of stoving temperatures.

Do you see developments that could make it easier to use powder coatings on non-conductive substrates? There are already sufficient solutions that support non-conductive-substrate coatings as long as the substrates can be heated. Challenges arise when the substrate is non-conductive and cannot be heated. Then you need to look for alternatives involving UV curing or LTC curing. In recent years, we have noticed a significant rise in research activity into technologies for low-temperature coatings, which indicates that the industry is actively looking for innovations for coatings on non-conductive substrates.

Lowering the stoving temperature for powder coatings is commonly seen as a way to open up new market segments. Do you see potential to go much lower than today's temperatures? Lowering the temperature tends to have more to do with the stability, shelf life

and process stability of the powder coating rather than the curing chemistry itself. The potential to lower the curing temperature is always there, but would entail extensive modification to the base chemistry. This modification would be needed in order to provide proper flow and finishing while maintaining process safety and ensuring shelf-life stability of the end product. We offer an epoxy resin, which is suitable for wood and other non-conductive substrates, we can attain curing temperatures as low as 110 °C, but to achieve even lower temperatures we need to be creative with regard to the process and to the overall formulation aspect.

What other technical developments do you see for powder coatings in the next few years? It is an exciting time for powder coatings. With the industry expected to grow at 5-6% CAGR, especially in emerging economies, we foresee many new avenues for

exploring technical developments in the next three to five years. Developments should not only positively impact the life-cycle costs of coatings and provide enhanced performance, but should also be environmentally friendly and sustainable. In our opinion, some of the upcoming areas of technical developments are flame retardancy effected with non-halogenated materials, antibacterial applications on epoxies, nanotechnology

in coatings and diffusion of nanotechnology with nanofillers and graphene – to name a few. Regulatory-driven requirements are also an important factor that lead to new product developments in the powder coatings industry. At Olin, we have been actively working on developing specialty products for epoxy-based functional applications that provide improved corrosion resistance, high-temperature resistance and toughening prop-

erties. In epoxy-hybrid based decorative coatings, we foresee more technical developments aimed at creating differentiation through finishes. Improvements to finishes in the form of low gloss, hammer-tones, and textured would drive innovation. Last but not least, while not a classical technical development, the industry is certainly very receptive to process-based innovation that is enabled through digitisation initiatives! 



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Current trends in corrosion protection



Dr Peter Plagemann
Fraunhofer IFAM
Hall 5, Stand 5-339

We spoke to Dr Peter Plagemann, group manager electrochemistry and corrosion protection of Fraunhofer IFAM, about how prominent water-borne and self-healing coatings are in the field.

What is in the focus of R & D efforts in corrosion protection? Besides traditional questions such as lifetime predictability and acceleration of corrosion testing, there is a particular focus on replacing non-REACH-conform components. Chromates are familiar examples, and in some applications, are still of technical relevance. Further raw materials are under discussion and it can be expected that more and more components might become under regulatory threat.

How prominent are water-borne systems in the field? In automotive applications, water-borne coatings are state of the art. At least electrochemically applied coatings are principally water-borne. Nevertheless, in heavy duty applications water-based options have minor

meaning. This is a pity, because water-borne solutions are available for this area, too – such as water-based zinc primer.

What is the status quo regarding the use of self-healing coatings in corrosion protection? In several research projects, the applicability of self-healing coatings has been successfully demonstrated. Several systems have proven to be suitable for various applications, such as automotive and heavy duty (e.g. in ship building). However, they have not been implemented commercially so far. Only a few examples in commercial application are known, for instance in wood protection.

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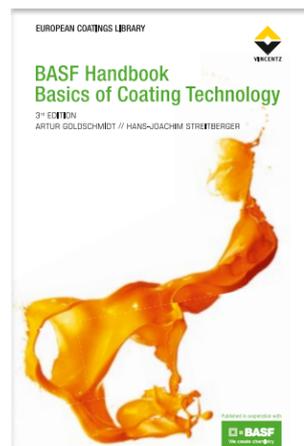
From A for “accelerated testing,” to W for “water-borne acrylates for decorative coatings,” our extensive range of books cover a wide variety of topics. If you are looking for an overview of the industry or want to deepen your knowledge in a specific field, there are plenty of titles available, written by our coatings and raw material experts from industry and academia. Whether you are somewhat of a newcomer to the world of paints and coatings or if you already have years of experience under your belt: discover the European Coatings Library online or visit us at the ECS in hall 4, stand 4-360. We have a large selection of books on display.



FILLERS FOR PAINTS

3rd Edition
By Detlef Gysau

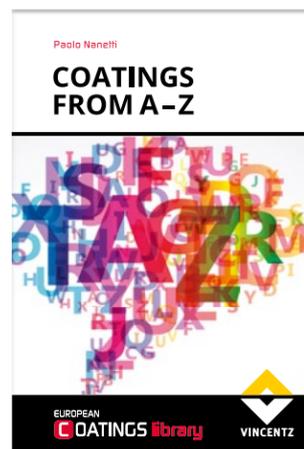
Explained clearly and simply, without sacrificing scientific expertise or attention to detail, this book enables the reader to speedily gain a comprehensive overview of the working mechanisms and possible application areas of the most common fillers. Now available in its 3rd edition, the book has been updated with the latest market data, information about new fillers and an outlook on future trends, such as sustainability and light weight fillers.



BASF HANDBOOK ON BASICS OF COATING TECHNOLOGY

3rd Edition
By Artur Goldschmidt and Hans-Joachim Streitberger

This newly designed reprint describes the latest developments and trends in coating technology, with an emphasis on coating applications such as automotive production coating, coil coating, automotive repair coating, and industrial coating in general. From product composition, raw materials, principles of product formulation and the relevant production processes, all the way to theoretical aspects of coating composition, applications and the substrate's impact on the coating process, the handbook addresses the different topics concisely. The various industrial sectors of the paint and coatings industry are covered and backed up by multiple examples and illustrations. This internationally well-established classic also features standard tables, general performance indicators, definitions of terms, and a comprehensive index.



COATINGS FROM A – Z,

2nd Revised Edition
Paolo Nanetti

Need to look up special terms and keywords in the field of coatings technology? Now in its 2nd edition, “Coatings from A–Z” is a clear, compact, and easy-to-use technical lexicon that provides a comprehensive selection of coatings-related keywords. Enriched with many practical examples, it is an efficient aid for both newcomers to the industry and readers with a technical background.

PRODUCTION TECHNOLOGY

DOSING PROCESSES AND ACCURACY ARE THE FOCUS

Digitisation is changing the production of coatings



Patrick Steeb
Ingtech Technik
Hall 5, Stand 5-120

Classic series production seems to be on the decline generally. Are you also seeing this in the coatings industry and how is this affecting the development of new production systems? We are seeing a different weighting of the production processes. Whereas, in the past, the focus was on mixing and dispersing systems, today, as the degree of automation increases, the focus is on dosing processes and their system accuracy. Those who come up with the right answers here will be ahead of the pack. This includes not only the equipment technology, but also its process-specific control and monitoring. In 3D pulse technology, we have found a solution that we will be presenting at ECS 2019.

What role do digitisation and automation play in the production of modern coating systems? Patrick Steeb of Ingtech Technik believes that digitization in particular can be selective for the industry.

What influence is the trend towards increasing digitisation of production systems for the coatings industry having?

This will have a selective impact, as it has throughout all the stages of industrialisation. Those who fail to engage will be weakened and, in the best case, merged. As machine and plant manufacturers, we therefore develop our own control systems. This enables us to secure our intellectual property worldwide and to interlock the functions of the mechanics with those of the process and recipe control, in the same way that a high-quality mechanical clock movement is interlocked with a perpetual calendar. That will secure our future.

What other developments are currently influencing the production of coatings? We have tried to outline a partial answer in the previous answer. However, we know that this is only one side of the coin; the other side is written by legislators and the raw materials industry.



Source: gdlvcom - stock.adobe.com

VOICE

NEW TO ECS?



Andrés Muñoz
Ketan Europa
Hall 6, Stand 6-455

automatic labelling solutions. We operate on the packaging market focused not only on the quickly and efficiently application of labels, but also, on the innovation of the solutions provided to our customers. Our machines are manufactured to the highest standards in the industry. We use top quality components in order to provide customers with superior reliability, ensuring employee safety, easy operation and low maintenance costs.

around labels to a high speed perfectly smoothly and with great precision. It's also possible to produce the machine with Atex certification. After 15 years working in the paint industry, we can handle all type of different containers with standard or customized solutions.

Please describe your company in a few words. How is your enterprise related to the paint and coatings industry? Ketan Europa is a worldwide company specialised in

What products will your company present in Nuremberg? We'll be presenting our rotatory labelling machine LW-50R for paints and coatings pails. This type of machine can apply wrap

What are you looking forward to doing/seeing at the ECS? Our main objective is to consolidate ourselves in the coatings and paints sector and open up market to potential customers. At the same time, our participation in the show gives us the opportunity to strengthen our relationship with existing customers exchanging new needs and concerns.



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NEW PRODUCTS

ON DISPLAY

Plenty of novelties to launch at the ECS

EXPANDED CATALYST AND RESIN MODIFIER PORTFOLIO

King Industries will be showcasing a range of high-performance solutions for water-borne, high solids, low temperature cure, and silane-modified systems. The company's dedication to innovation and sustainability has led to the development of new technologies and an expansion of the "Nacure" catalysts, "K-Kat" non-tin catalysts, and "K-Flex" resin modifiers portfolios.

KING INDUSTRIES
US-Norwalk
www.kingindustries.com
Stand 1-544

SPECIALTY CARBON BLACKS AND FUMED SILICA ADDITIVES

The company will showcase its industry-leading carbon blacks, fumed silicas and fumed aluminas for automotive and industrial coatings and adhesives. Highlighted products include: "Emperor 2000" and 1800 high colour carbon blacks, which offer superior jetness for environmentally responsible water-based applications including automotive basecoats. "Cab-O-Sil" fumed silicas and "SpectraI" fumed aluminas for coatings and adhesives are designed to simplify incorporation and maximise performance.

Cabot will also showcase its line of "Cab-O-Sperse" dispersions, which enable the performance functionalities of its powder products with the added benefits of improved ease-of-use and state of dispersion.

CABOT CORPORATION
CH-Schaffhausen
www.cabotcorp.com
Stand 1-243

FOR HIGHLY DEMANDING APPLICATIONS

Shepherd Color will be supporting their high-durability and specialised pigments that have made them the standard for highly demanding applications. At the ECS, the company will be highlighting two key technologies: the unique and ground-breaking "NTP Yellow" and the new and improved "RTZ Orange". These two pigments give formulators and chemists key tools to address chromaticity, opacity, and durability in the colour space formerly held by lead chromates. These highly engineered pigments are excellent color-

ants for demanding thin film applications and are compatible with a wide range of resins.

SHEPHERD COLOR COMPANY
US-Cincinnati
www.shepherdcolor.com
Stand 9-340



BOOSTING OPACITY

Omya will present "ChameleoBoost" at this year's ECS as a unique solution for boosting opacity. The powder and slurry products using this technology optimise formulation cost by using qualified functional mineral fillers. They either enhance coating performance at equal formulation cost or reduce formulation cost (e.g. partial substitution of titanium dioxide) while maintaining performance. Any combination of the two is also possible. "ChameleoBoost" offers formulators greater opacity, brightness, titanium dioxide performance or the option

to partially substitute TiO₂. It can space and stabilise pigment dispersions and help to control gloss and reduce the carbon footprint of their formulations. The broad application field covers the entire PVC range of decorative paints for matt as well as gloss paint systems.

OMYA
DE-Cologne
www.omya.com
Stand 7-346



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ECO-FRIENDLY STYRENE-ACRYLIC DISPERSION FOR PAINTS

“Acrilem ST170” is an APEO- and formaldehyde-free styrene-acrylic emulsion for use in outdoor and indoor paint formulations. Developed in part to comply with REACH legislation, it improves on previous products by using a new adhesion promoter technology. As a result, it offers better adhesion to mineral substrates than its predecessors as well as improved water repellency, washability and wet scrub resistance. All whilst maintaining the colour acceptance, mechanical

resistance, filler stability, and compatibility with common additives expected from previous products. The eco-friendly emulsion means formulators can use less binder without compromising on washability, thereby reducing costs.

ICAP SIRA CHEMICALS & POLYMERS

IT-Parabiago
www.icapsira.com
Stand 7-530

ECO-FRIENDLY SOLUTIONS FOR PU COATINGS AND ADHESIVES

Vencorex will present „Easaqua“ grades at the ECS. These self-emulsifiable polyisocyanates, used as crosslinkers for efficient environmentally-friendly water-borne polyurethanes, offer an alternative to conventional solvent-based formulations. Among their latest innovations are „Easaqua L 600“, which is especially designed to meet the highest demands for humidity and chemical resistance; „Easaqua X D 870“, supplied in an eco-friendly solvent, is a ready to use solution for fast drying and high mechanical performances coatings.

In addition, „Tolonate“ grades will be presented. These aliphatic polyisocyanates for high-per-

formance polyurethane coatings and adhesives offer exceptional durability and non-yellowing properties upon ageing. Among the grades, which are specifically designed for low VOC and solvent-free formulations, are „Tolonate X FLO 100“, a bio-based and low-viscosity aliphatic polymer, a good solution for solvent-free formulations; „Tolonate HDT-LV“ and „Tolonate HDT-LV2“, specifically designed for low-VOC 2K formulations.

VENCOREX

FR-Saint Priest
www.vencorex.com
Stand 4-662

NITROCELLULOSE-BASED PRODUCTS FOR FORMULATORS

Nitro Quimica, the leading global manufacturer of nitrocellulose and nitrocellulose-based specialty chemicals will feature the following products at the ECS: Its “NQ Cotton” line offers variations of industrial nitrocellulose in cotton format and are recommended for diverse industrial segments such as printing inks, nail polish, wood, automotive, and pharmaceutical. “NQ Prisma” is a premium line offering maximum technical performance for products that require special certifications.

The company will also introduce a new product line that consists of granular plasticised nitrocellulose designed to meet specific formulation needs, such as lower water content in comparison with damped nitrocellulose.

CIA. BRASILEIRA NITRO QUIMICA

BR-Sao Paulo
www.nitroquimica.com.br
Stand 4-314

SPECIALIST AGITATORS FOR INDUSTRIAL PROCESSES



Stand-alone tripod agitators offer a level of flexibility and operational safety increasingly required by companies performing entire production stages in small-medium-sized containers. Geppert's agitators offer the latest process control, are highly reliable and easy to clean and maintain. They offer online viscosity measurements and can be delivered as explosion-proof models for use in hazardous zones 1 and 2 as well as containers with hazardous zones 0 to 1. At the ECS, the company will demonstrate an array of applications to showcase the possibilities of their tripod agitators.

GEPPERT RÜHRTECHNIK

DE-Erzhausen
www.geppert-mixing.de
Stand 6-335

EXPANDED RANGES TO MEET DEMANDING REQUIREMENTS



In line with upcoming regulatory limits for methylisothiazolinone (MIT) Lanxess will showcase the MIT-free “Preventol” microbiocide range along with a new generation of dry-film products

> the “Preventol next” series with innovative slow-release technology. The company will also showcase:

> New “Bayferrox 500” products to complete the company's comprehensive portfolio of red iron oxide pigments.

> “Levanyl” (organic pigment), new “Levanyl X” and “Levanox” (inorganic paste) as waterbased pigment preparations for paints and coatings, wood stains and inks.

> “Bayscript” water-based dyes for ink-jet and stationery inks.

> “Witcobond”, a range of aqueous polyurethane dispersions (PUDs).

> “Trixene” cross-linkers and blocked isocyanate products, and the low monomer “Trixene LF” and “Adiprene LF” solutions for coatings, adhesives and sealants.

LANXESS DEUTSCHLAND

DE-Cologne
www.lanxess.com
Stand 7-145

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COLOURFUL ARCHITECTURE

The largest colour manufacturing company in the Asia-Pacific region, Soujanya will showcase a set of brilliant inorganic colours especially for use in facades. The colourants are VOC-free, APEO-free and have exceptional light and weather fastness. The "WallTint" range is designed for the low-cost, affordable housing space. They are liquid flowable colours that directly mix with concrete and are easy to use on site. A series of solvent-free epoxy colourants for floor coatings, "Blend", can

now be dispensed through POS machines to tint any RAL shade, the formulations for which the company also provides.

SOUJANYA COLOR

IN-Mumbai
www.soujanya.com
 Stand 9-437

THE FUTURE OF DRY-FILM PROTECTION

Troy will feature its advanced dry-film preservatives, including its new, innovative controlled-release products based on the company's next generation microencapsulation technology. The "Polyphase" and "Troysan CR" preservative range offer highly effective long-lasting protection against fungi and algae and enhanced resistance to leaching.

Its line of advanced "Mergal" and "Nuosept" MIT-free wet-state preservatives for European manufacturers includes "Mergal ZBIT", which offers long-lasting, broad-spectrum protection against bacteria, fungi, and yeast.

The company will showcase its full portfolio of performance additives as well as metal carboxylates. Troy's new, advanced multifunctional dispersant, "Troysperse ZWD8" is a 100% active, polymeric wetting and dispersing additive for titanium dioxide and inorganic pigments in aqueous coating applications.

TROY CHEMICAL COMPANY

NL-Maassluis
www.troycorp.com
 Stand 7A-125

TESTING IMPROVEMENTS



Source: Defelsko

New products presented at this year's ECS include the "PosiTest PC Powder Checker", which has been redesigned as a dedicated stand-alone unit. It measures uncured powder coatings using non-contact ultrasound technology to predict a cured thickness ensuring adequate coverage and reducing waste.

The new lightweight, ergonomic "PosiTest LPD" uses a wet sponge to detect holidays, pinholes, discontinuities and other coating flaws on metal and concrete substrates without damaging the coating. Features include four regulated voltage output options and "GroundSense" to reassure the user that the instrument is properly grounded.

Other products include the "PosiTector 6000" series of coating thickness gages, the "PosiTector SST Soluble Salt Tester" and the "PosiTest AT Adhesion Tester".

DEFELSKO

US-Ogdensburg
www.defelsko.com
 Stand 5-444

COST-SAVING COLOUR MANAGEMENT

The global leader in colour management solutions will introduce its new hyperspectral spectrophotometer "SpectraVision". This solution reduces development and production processes by weeks or months, produces consistent, repeatable results for multi-coloured and/or textured materials, and saves up to 50% of colour approval process costs.

Datacolor will also exhibit the new "Match Pigment" software for plastic manufacturers.

Using the innovative "SmartMatch" technology,

this software helps manufacturers efficiently and confidently achieve their desired colour while saving time and money. "Match Pigment" improves match acceptance on the first try, optimises the cost and quality of recipes, and reduces the need for physical matches.

DATACOLOR AG EUROPE

CH-Dietlikon
www.datacolor.com
 Stand 5-338

MAKING QUICK WORK OF GRINDING

This year's ECS will see the launch of the "Kreis-Basket-Mill-RS". The new basket mill type in the range is suitable for the production of pigment pastes, industrial coatings, flexographic inks and other products that are difficult to grind. Its annular gap technology ensures better quality and shorter grinding times.

Another highlight is a top-mounted vacuum dissolver "ADV 1500" with a walking platform and a useful 3000-litre container volume. The company will also showcase its new explosion-proof

lab dissolver "KDV 31" prototype and display its exclusive recipe-driven semi and fully automatic PC/PLC-control systems "KD-Batch-Control" and "KB-Mill-Control" on various machines in cooperation with Schulz Systemtechnik.

WILHELM NIEMANN

DE-Melle-Neuenkirchen
www.niemann.de
 Stand 6-227

HIGH-PERFORMANCE WATER-BORNE DISPERSIONS

"Aptalon W8030", a new self-matting 1K PUD based on Lubrizol's "Aptalon" polyamide technology portfolio, is a water-borne, selfcrosslinking resin. It meets or exceeds the performance properties of many 2K solventborne finishes without the need for external cross-linkers. "Carboset CR-3100" is a water-borne, styrene-acrylic emulsion that is excellent for low VOC direct-to-metal coatings and can be formulated to a range of glosses. The company will also present "a new addition to its advanced water-borne dispersants range, which

also includes "Solsperse W100" and "Solsperse WV400". It is specifically designed to provide rapid dispersion of organic pigments and high-performance carbon blacks and offers long-term stability and excellent rheology control.

LUBRIZOL DEUTSCHLAND

DE-Ritterhude
www.lubrizol.com/coatings
 Stand 1-554

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BIOCIDES

CHALLENGES TO USE BIOCIDES

Regulation is becoming tighter



David Zim
Vink Chemicals
Hall 1, Stand 1-248

Biocides play a major role in keeping paints and coatings free of harmful microorganisms. However, regulation of biocides is affecting their usage more and more. We spoke with David Zim, CMO at Vink Chemicals about strategies to cope with the current challenges.

What are the current challenges facing paint manufacturers when using biocides in their products? The regulatory fundamentals are becoming increasingly stricter and restricting the number of biocides available on the market. Printing ink and adhesive manufacturers who have to meet the standards for indirect food contact – keyword methyl isothiazolinone (MIT) – face particular challenges. The manufacturers of coatings, printing inks and adhesives must, and naturally want to, comply with their legal obligations and it is important to offer our cus-

tomers solutions based on the biocides available on the market.

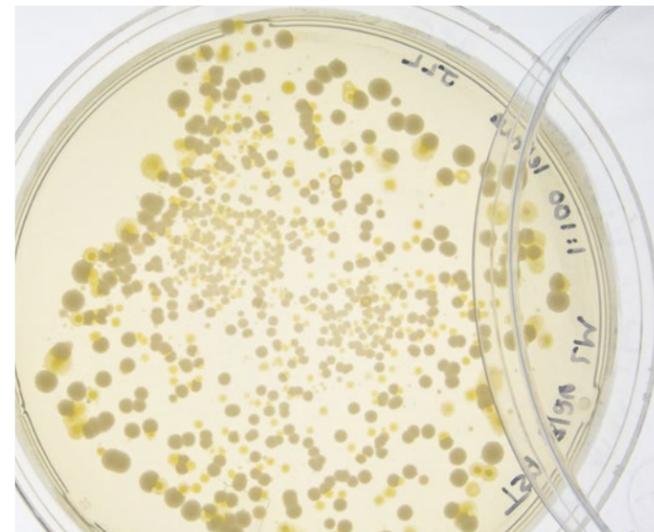
What do these solutions typically look like? Together with our customers, we review the biocides used in the formulations and then we make a joint decision as to whether or not the legal requirements can be met by adjusting the dosages. If this is not the case, we work with the customer to develop a new product, generally using a suitable combination of approved biocides. This combination needs to be able to combat a wide range of harmful micro-organisms, be economical in use and naturally pose no threat to the user.

Are new regulatory-compliant biocides actually being developed in the market? At the moment, it cannot be assumed that new active ingredients will be developed in the foreseeable future. It is extremely expensive to develop a new product, get ap-

proval, and conduct all mandatory tests and studies. Development costs are estimated to be in the double-digit millions and even then there is no certainty that the active ingredient will actually be approved.

So, all that remains is to use the existing active ingredients? In theory, yes. But, apart from the active ingredients themselves, we also take a close look at industrial hygiene with the customers. Of course, we didn't invent this approach, but given the current fundamentals it is a good starting point for manufacturing biocidal coating systems that are regulatory-compliant.

What do you mean? Many of the active ingredients used so far in certain coating systems, e.g. for the DIY sector, have already had their approval revoked or will no longer be approved in the future. Approved active ingredients must be added in the highest-neces-



Source: erbephoto - Fotolia.com

sary, but lowest-possible doses. Dosages of approved biocides can, if necessary, be reduced by improving pipeline hygiene. We recently develop a pipeline cleaning system that is a combination of chemical active ingredient and

mechanical cleaning. This makes it possible to boost the effectiveness of industrial hygiene and to develop the optimum biocide dosage in the coating systems. ☛

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NEW PRODUCTS

ON DISPLAY

Plenty of novelties to launch at the ECS

INNOVATIONS FOR SUSTAINABLE DEVELOPMENTS

“City of Sustainnovation” – Covestro’s booth motto at the ECS 2019 – promotes innovations for sustainable developments that are pushing boundaries. In addition to water-based and other low-VOC coatings, the company is focusing on bio-based raw materials and, for the first time, biodegradable products.

Applications of „Desmodur ultra“ will be presented, using a coated fender as an example. This polyurethane hardener contains less than 0.1 % by weight of free diisocyanate monomer, and thus complies with the guidelines of the current REACH restriction dossier for limiting the use of diisocyanate hardeners.

The company is now launching the new „Bayhydur quix 306-70“ hydrophilic polyisocyanate hybrid hardener – the first of its kind, which will

enable dual-component, water-based wood and furniture coatings with similar quick drying properties that are found in solvent-based systems. The pot life meets the requirements of the coatings industry.

The new product „Desmophen NH 1423“, an amino-functional reaction partner for polyisocyanates, will also be presented. In coating formulas, it ensures improved gloss retention properties – for example, in large-surface applications such as sports arenas, wind farm towers and agricultural and construction machinery.

COVESTRO

DE-Leverkusen
www.covestro.com
Stand 4A-528

MINERAL-BASED DEVELOPMENTS FOR SUSTAINABLE PAINTS

The world’s leading minerals producer, Imerys, will be presenting its latest mineralbased developments for sustainable decorative paints and industrial coatings. These include:

- > “ClearLite”, which brings a new level of transparency to water-based clear coating systems.
- > “PlastGard” is a new engineered perlite additive for interior or exterior applications.
- > “SteaShield 10” and “Mica MU M2/1” are innovations for high performance stainblocking paints.
- > “Wollastonites” as fillers of choice for label-free, very low biocide-containing aqueous wall paints.

- > The kaolins “Opacilite” and “NeoGen MX” for decorative matt paints, and
- > “ImerPrint” – a range of extenders specifically designed for the ink market to extend titanium dioxide and resin.

IMERYS MINERALS

UK-Cornwall
www.imerys.com
Stand 7-333

AUTOMOTIVE COATINGS

“AESTHETIC COATINGS WILL PLAY A VITAL ROLE IN CAR INTERIORS”

Self-driving vehicles will have an impact on the automotive coatings market



Yan Lee
Allnex
Hall 1, Stand 1-532

The self-driving car could promote a shift from privately to publicly-owned cars, which would not only reduce the total market size but could also lead to partial commoditisation of the market, say Yan Lee, global marketing manager radcure for industrial plastics & consumer electronics, and Hans Schellekens, marketing manager LRA for automotive at Allnex.

What is the status quo in water-borne and low-VOC options in automotive coatings? There are large regional differ-

ences and differences per coating layer. For automotive OEM in the US and Europe, both water-borne and solvent-borne systems are used. Basecoats in Europe are now predominantly water-borne, while high solids basecoats are used in the US. China is moving rapidly from solvent-borne to water-borne, both for the primer and the basecoat. At the clearcoat layer level, in all regions, solvent-borne 1k and 2k are used. Generally speaking, the market share of 2k is growing, although 1k remains very attractive, mainly for cost reasons. Higher solids systems are always welcome, but

the big challenge right now is to achieve the optimum appearance with existing systems, particularly when used in compact processes. As far as the energy-curable coating technology is concerned, we definitely see an evolution of low-VOC coatings in the automotive market, particularly in the headlamp coatings application. OEMs have been resorting to solvent-borne UV technology for decades now, as it was a more environmentally-friendly solution that offers outstanding weathering, scratch and chemical resistance. Now, we're seeing that the headlamp market is rapidly switching to high-solids, low-viscosity UV solutions, as the 'next generation' products which allow them to slash or even negate VOC emissions. For automotive interior applications, the growing use of UV or water-borne UV technology on lightweight plastics components (such as door handles or consoles) instead of solvent-borne technology also proves that OEMs are now focusing on low-VOC solutions to meet the market's demand for improved fuel/electricity efficiency.

Looking at future developments, how will electric and self-driving vehicles change the automotive coatings sector? Both electric and self-driving vehicles will provide a more comfortable and safe experience for passengers, with the added benefit of energy savings. With self-driving vehicles, passengers can focus less on the road and

more on their surroundings, meaning that a refined overall interior design, colours and textures will be critical for both consumers and, by extension, OEMs, on top of the ever-present energy-savings aspect. In other words, aesthetic coatings will play a vital role in car interiors if OEMs want to achieve product customisation and provide an optimal luxury experience for their consumers. Soft-touch coatings, easy-to-clean and stain-resistant coatings for detection sensors, smart window film coatings for temperature control, and lightweight plastics coatings for improved energy efficiency will become essential. The performance requirements of these coatings will also be further increased and the energy curing systems can certainly play a big role in this evolution. The introduction of those new vehicles will in itself not change automotive OEM paint systems appreciably, since they will also need to be coated. The self-driving car could pave the way for the introduction of Uber-like driverless car-on-demand systems. This could affect the automotive coating sector as it could promote a shift from privately to publicly-owned cars, which would not only reduce the total market size but could also lead to partial commoditisation of the market. This will certainly not happen very quickly everywhere, but in well-developed, densely populated areas we expect to see the first trials coming as soon as in the next few years.



Hans Schellekens
Allnex

How would you describe the situation in the refinish market? The market is currently growing slowly but it is looking for solutions which support faster, low-VOC refinish processes that can shorten the time spent in body shops, bring improved energy efficiency and comply with VOC-related regulations. The market will however, in theory, become less relevant when 'safer' self-driving vehicles start to be more present on the road, as the accident rate would be expected to drop significantly, thus reducing the number of repair jobs. With self-driving vehicles growing more popular and consumers spending more time inside them, those vehicles may nonetheless require more frequent repairs and polishing. The big question is how fast this new technology will gain market share. ☑



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UV CURING

“HIGH PRODUCTIVITY RESULTS IN HIGHER THROUGHPUT”

Main drivers of radiation-curing technology



Xavier Drujon
Sartomer
Hall 4A, Stand 4A-313

Compliance with environmental regulations, a contribution to energy- and cost-efficient application processes, as well as high productivity are driving radiation curing technology. Xavier Drujon, technical service and development manager at Sartomer Europe, summarises the latest trends and development.

Apart from regulatory and environmental challenges, what are the main drivers of radiation-curing technology?

The growth rate of radiation-cure technology has been about 2.5 % above GDP in Europe for the past few years. We are seeing even higher growth rates for strong-growing segments, such as UV digital inks and additive manufacturing. In addition to complying with environmental regulations and contributing to energy- and cost-efficient application processes, which

remain core requirements for the coatings market, the main distinguishing feature of radiation curing technology is its high productivity. This high productivity results in higher throughput, smaller footprint and reduced inventory. Radiation curing technology also provides best-in-class scratch resistance and a quality of finish, which are key benefits for demanding specialty coating applications in markets such as automotive, furniture and cosmetic packaging.

In which application fields have UV/EB systems made significant inroads lately and why? As mentioned before, UV digital inks have developed very successfully because of the trend towards regionalisation, small batches and personalisation. Additive manufacturing, or 3D printing, is also a market that is growing strongly. More recently, there has been the emergence of

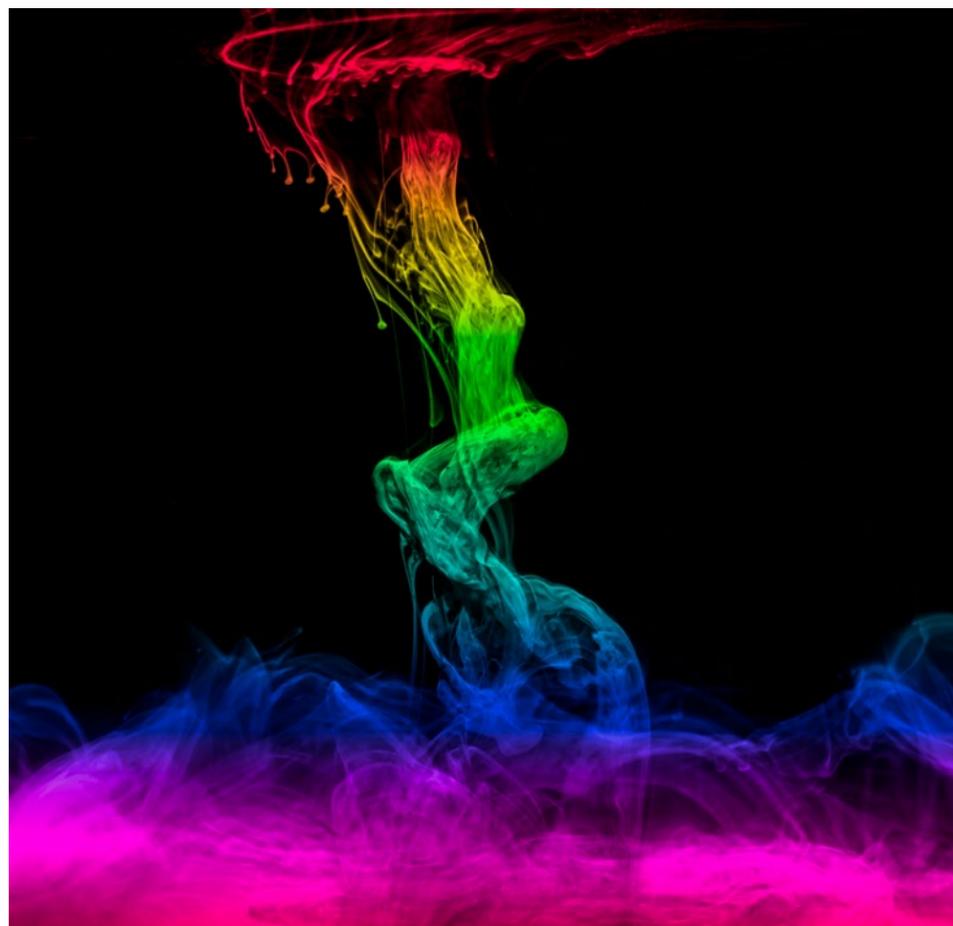
numerous on-site curing applications, generally using portable UV-LED lamps. The availability of LED lamps with more powerful output in a wider range of wavelengths makes it possible to develop new applications, such as car refinishing or on-site repair of wind turbines.

Of the latest developments in this area, which do you find especially interesting? The emergence of UV-LED and

EB curing. In about a decade, UV-LED curing has become the preferred solution for specific niche market segments, such as spot-cure adhesive and sealants, and inkjet pinning (slower speed and heat-sensitive applications) and is now even gaining some acceptance in the largest and most mature of all UV curable applications: wood coatings.

E-beam technology is very relevant in some high-speed, high layer-thickness and high-volume

applications, such as pigmented coil coating and release paper, due to better electron penetration through opaque substrates, and packaging printing for food contact, due to a lower likelihood of migration. Recent advances, involving more compact and less expensive equipment, can further expand the range of applications for this technology, which is projected to contribute substantially to the growth of radiation curing in the future.



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European Coatings Show Daily

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FUNCTIONAL COATINGS

“THE FORECAST FOR RESEARCH AND APPLICATIONS OF FUNCTIONAL COATINGS IS VERY OPTIMISTIC”

Predictions and trends



Dr. Eva García-Lecina
Cidetec Surface Engineering

“In relation to already developed functional coatings, the challenges that will improve market readiness are expected to be overcome”, says Dr. Eva García-Lecina, director of Cidetec Surface Engineering.

Which coating functionalities are the focus of research at the moment?

Research at the moment is focused on the development of tailored functionalities that are not found in traditional protective or tribological coatings, such as anti-contaminant and anti-glare properties, and is being driven by new markets and needs. As an example, in the automotive sector, the extensive introduction of touch-screen monitors and displays is promoting the development of anti-glare and anti-fingerprint transparent coatings which combine hydrophobic and oleophobic properties. In addition, the increasingly widespread incorporation of vehicle-sensing systems, such as radomes and cameras, is promoting research on coatings that have radar transparency and anti-ice and anti-dust functionalities that afford protection but do not interfere with system functionality. On the other hand, trends in shared mobility are bringing new challenges to do with cleanliness issues which are pushing new research into easy-to-clean and anti-bacterial coatings. In aer-



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onautics, research in functional coatings is oriented towards a number of properties, such as anti-contamination coatings and cleaning solutions for laminar wings, which could reduce insect accretion, or anti-icing smart coatings that combat ice formation on aircraft wings and so help to lower emissions and noise pollution.

Which functionalities do you believe have the most potential to become market-ready?

There is already a range of func-

tional coatings commercially available, covering functionalities such as self-cleaning, anti-icing, anti-bacterial and anti-fingerprint. However, even though the functionality of these coatings has been successfully demonstrated, there are still some drawbacks that prevent the extensive use of these coatings and their suitability for some applications. For example, further research is needed to increase the control, maintenance and long-term stability of some formulations,

to develop easy-to-apply and reproducible application methods, to increase the mechanical durability of the coatings and to make the technologies more cost effective. On the other hand, new coating functionalities require new test protocols and devices, which are not yet fully developed.

Do you see any overall trends in functional coatings?

The forecast for research and applications of functional coatings is very optimistic for the next

few years. In relation to already developed functional coatings, challenges already mentioned that will improve the market readiness of the innovations are expected to be overcome. Moreover, there is an overall trend towards looking for more eco- and bio-based formulations and combining properties with a view to obtaining multifunctionality, thereby helping to meet new market demands and improve social wellbeing. 

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THINKING OF TOMORROW

NOVELTIES

TODAY'S PRODUCT PRESENTATIONS

HALL 1, STAND 1-131

9:50 - 10:10

Stabilised reducing agents as initiators for emulsion polymerisations

Dr Stefan Mark, Brüggemann Chemical, DE

10:10 - 10:30

Cure-2-Go: New epoxy floor coatings with unrivalled fast cure and improved aesthetics

Dirk Fuchsmann, Evonik Industries, DE

10:30 - 10:50

New epoxy-functional silane resin for polymer dispersions

Dennis Bringmann, Evonik Industries, DE

10:50 - 11:10

Improved tile adhesives – long open time and short setting time by special starch ethers from Agrana

Matthäus Haider, Agrana Stärke, AT

11:10 - 11:30

2EHA and DOTP: Sibur expands 2EH derivatives range

Sergey Radchenko, Sibur International, AT

11:30 - 11:50

Turning challenges into chances – inside regulatory affairs

Carina Kraft, Byk-Chemie, DE

11:50 - 12:10

Well-being and sustainability solutions

Frank XU, Solvay, FR

12:10 - 12:30

Self-cleaning elastomeric cool roof coatings with superior performance

Dr Peter Greenwood, Levasil, Akzo Nobel Pulp and Performance, SE

13:10 - 13:30

Why Lissy projectmanagement system is the ideal digitisation tool

Mike Bach, Prisma Gesellschaft für angewandte Informatik, DE

13:30 - 13:50

Smooth coating surfaces with superwetters

Christine Louis, Evonik Industries, DE

13:50 - 14:10

Basics on characterising coatings and powders via particle size distribution and zeta

Vanessa Fronk, Anton Paar Germany, DE

14:10 - 14:30

New silicone-free defoamer for efficient high speed application in coil coatings and for general industrial coatings spray application

Carina Schepers, Byk-Chemie, DE

14:30 - 14:50

Garamite, unique rheology modifier and anti-settling agent for solvent-borne and solvent-free systems

Brigitte Weber, Byk-Chemie, DE

14:50 - 15:10

Water-borne tackifier for latex adhesives

Matthias Steffen, Rütgers Germany, DE

15:10 - 15:30

The future is macromer – solution provider for multi-layer application

Markus Heekeren, Byk-Chemie, DE

15:30 - 15:50

Start-up Session

Chemovator, DE

15:50 - 16:10

Start-up Session

Othrys Technologies, AU

16:10 - 16:30

Start-up Session

Hexigone Inhibitors, GB

16:30 - 16:50

Start-up Session

Greenovoc Specialty Coatings, IN

HALL 4, STAND 4-214

9:50 - 10:10

Byk-1680 – liquid defoamer for PCE admixtures & concrete applications

Dr Markus Möller, Byk-Chemie, DE

10:10 - 10:30

High-performance mineral opacifiers for coatings

Dr Anil Bansal, 20 Microns, IN

10:30 - 10:50

Adding yellow to the shades of red – Bayferrox new red pigments

Sandra Schriefers, Lanxess Deutschland, DE

10:50 - 11:10

Sylowwhite SM 405 – an efficient TiO₂ extender for emulsion paints

Dr Alexander Kröger, Grace, DE

11:10 - 11:30

Introduction of low viscosity HDI-polyisocyanates for super high-solid formulations

Satoshi Takeno, Asahi Kasei, JP

11:30 - 11:50

Meeting global regulatory drivers while boosting applicator productivity

Marina-Elena Schmidt, Evonik Industries, DE

11:50 - 12:10

Pressure-sensitive adhesives solutions by Arkema, a multi-technology expert

Sebastian Wiesner, Arkema France, FR

12:10 - 12:30

Dispercoll U 66 – a new high-performance polyurethane dispersion

Wolfgang Arndt, Covestro Deutschland, DE

13:10 - 13:30

Barrier coating, the sustainable performance alternative to conventional food and non-food paperboard packaging solutions

Mourad Aabich, DSM Coating Resin, NL

13:30 - 13:50

Calcined NSE in adhesives with high strength based on silane terminated polymers

D. Meinhart Roth, Hoffmann Mineral, DE

13:50 - 14:10

How Decovery by DSM is leading the plant-based movement in coatings

Ruben Pleijzier, DSM Coating Resin, NL

14:10 - 14:30

Excellent performance at highest application speeds – new silicone surfactant for water-borne wood coatings

Marcus Wessel, Byk-Chemie, DE

14:30 - 14:50

Hydroxyl-functional Resins for high-performance & environment-friendly 2K PUR coatings

Dr Martin Ocepek, Helios TBLUS, SI

14:50 - 15:10

Veova silane technology – high-performance isocyanate-free protective topcoats made affordable

Bo Ngjabprasert, Hexion, NL

15:10 - 15:30

New plasticising co-monomer for use in emulsion polymerisation

Dr Christian Weidl, BASF, DE

15:30 - 15:50

Solsperse hyperdispersants: more efficient ways of dispersing pigment in Water-based coatings

Christopher Williams, Lubrizol Deutschland, DE

15:50 - 16:10

Tego glide recoatable

Heike Semmler, Evonik Industries, DE

16:10 - 16:30

Revacryl L 8761 – solvent-free styrene-acrylic dispersion for high performance paste tile adhesives (EN12004-D2)

Jean-Luc Montanari, Synthomer Deutschland, DE

16:30 - 16:50

Alkyds – water-borne solutions in coatings

David Löf, Perstorp, SE

HALL 9, STAND 9-544

9:50 - 10:10

Improved occupational hygiene through REACH: polyurethane hardeners

Dr Joachim Petzoldt, Covestro Deutschland, DE

10:10 - 10:30

Specific water dispersible HDI-polyisocyanates for WB 2KPU coatings

Dr Changfeng Hong, Asahi Kasei, JP

10:30 - 10:50

ClearLite from Imerys: a new level of transparency in matt clear coatings

Estelle Lagache, Imerys Minerals, GB

10:50 - 11:10

Level up your polyurethane powder with Vestagon EP-BF 1350

Andre Raukamp, Evonik Industries, DE

11:10 - 11:30

Rheobyk: unique rheology additives not only for latest water-borne epoxy coatings

Heiko Juckel, Byk-Chemie, DE

11:30 - 11:50

Surfynol 107 L – effective wetting in dynamic printing applications combined with good foam prevention

Dr Vedran Durasevic, Evonik Industries, DE

11:50 - 12:10

Creating a sustainable, safe and a better future by expanding our NeoCryl portfolio

Brigitte Jacobs, DSM Coating Resin, NL

12:10 - 12:30

Fast drying 2K water-borne PU: highly reactive wood coatings systems using novel polyols and crosslinkers

Dr Eva Tejada, Covestro Deutschland, DE

13:10 - 13:30

Acematt 3400 – new high-performance matting agent with high transparency and soft-touch properties for high-quality coating applications

Jos van Oosterwijk, Evonik Industries, DE

13:30 - 13:50

Radiantly colourful - solvent-free wetting and dispersing additive for radiation-curable wood and furniture coatings

Holger Wach, Byk-Chemie, DE

13:50 - 14:10

Hydrophobic modifiers for water-borne protective coatings

Benjamin Boenigk, Rütgers Germany, DE

14:10 - 14:30

Novel polyester resins for BPA-NI can coatings

Gregor Vilfan, Helios TBLUS, SI

14:30 - 14:50

WorléeProtect – a high-performance thin film barrier

Dr Stefan Scholz, Worlée Chemie, DE

14:50 - 15:10

Decovery SP-2022, the ultimate self-matting solution for floors

Sjoerd Buil, DSM Coating Resin, NL

15:10 - 15:30

An epoxy derived polyol hybrid system for polyurethanes

Dr Julian Schäfer, CTP Chemicals and Technologies for Polymers, DE

15:30 - 15:50

Use the novel Liquid Needle technology for fast and most precise optimisation of your coating-substrate adhesion

Dr Daniel Frese, Krüss, DE

15:50 - 16:10

Navigating a new course: selecting an effective MIT-free alternative

Nicolas Barbier, Troy Chemical Company, NL

16:10 - 16:30

Multi-purpose UV PUD for water-borne UV formulations designed for industrial wood applications

Xavier Deruyttere, Allnex Netherlands, NL

16:30 - 16:50

A new isocyanate for high performances polyurethane coatings

Nina Resham, Vencorex France, FR



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INDUSTRIAL COATINGS

“THE INDUSTRY’S VIEW OF SUSTAINABILITY IS ALSO EVOLVING”

Carbon footprint reduction can lead to a higher demand in direct-to-metal systems



Steve Willoughby
Eastman Chemical
Hall 9, Stand 9-361

According to Steve Willoughby, global segment leader, coatings & inks at Eastman, higher performance systems and sustainable solutions are increasingly being demanded in the industrial coatings segment. He talks about trends in the

industry, such as making the carbon footprint from coatings more important. Additionally, technology is driving producers toward digitisation and Industry 4.0, where the main focus is on centralising data and production to improve the quality and consistency of products.

How would you describe the European industrial coatings market? The European industrial coatings market is highly diverse and complex, which has made it an engine for innovation. With a strong base of small and mid-sized companies throughout the value chain, the region offers a wide variety of OEMs and their suppliers. Each of these has their own specifications, helping to create a highly competitive market that draws coatings companies of all sizes. Across this complex

and innovative landscape, performance demands are increasing. Consumers are demanding higher performance and sustainability from the products they purchase, driving requirements to become more specific. Products are expected to last longer and perform better, making protection and durability higher priorities for OEMs, coatings manufacturers, and consumers alike.

From your perspective, what are the overall trends in industrial coatings? Performance, technology, and sustainability are shaping the European industrial coatings market. Performance encompasses several areas, ranging from protection through to functionality. As consumers demand higher-quality and longer-lasting goods, protection has become increasingly important. For example, con-

sumers are demanding a longer service life from products, which coatings support by preventing scratches, enduring challenging environments, and resisting some of the harshest chemicals. Functionality encompasses a wide variety of emerging capabilities ranging from easy-to-clean through self-healing coatings. Technology is driving producers towards digitisation and Industry 4.0, where the main focus is on centralising data and production to improve the quality and consistency of products. The industry's view of sustainability is also evolving. Volatile organic compounds (VOCs) are still a hot topic, but the industry's focus is shifting towards the bigger picture, making the carbon footprint from coatings more important. This progression benefits high-solids coating solutions over water-borne coatings. High-sol-



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ids coatings solutions traditionally have lower carbon footprints along the whole value chain.

Do you see a general preference for a specific type of low-VOC technology in industrial coatings? While compliance with VOC regulations is required, the importance of a coating's carbon footprint has also increased. This is being driven by the desire of OEMs to create more-sustainable products. In general, a carbon footprint reduction can lead to a higher demand in direct-to-metal systems. These DTM systems eliminate layers and can significantly lower emissions. These single-coat solutions need

to fulfil the same requirements as multi-layer systems, and the performance gap between them is closing. The latest technologies, such as Eastman's protective resins, enable wet adhesion on smooth metal substrates that historically have had corrosion-resistance challenges, including cold rolled steel, phosphate treated steel, and galvanised steel. Ultra-high solids, solvent-borne systems are gaining traction as well. The combination of higher solids coatings and the resulting layer elimination maximises carbon reduction, leading to improved sustainability at a lower cost.

NEW PRODUCTS

ON DISPLAY

Plenty of novelties to launch at the ECS

DEFOAMERS AND WETTING AGENTS

Evonik presents its updated portfolio of defoamers and wetting agents for food packaging at the ECS. With these products from the coating additives business line, formulators can optimise the performance of their products and ensure compliance with numerous food packaging regulations.

These products include the siloxane-based defoamers „Airase 5355“ and „Airase 5655“ as well as the organic defoamer „Airase 4655“. As wet-

ting agents, the company presents „Surfynol 355“ with particularly comprehensive compliance with food regulations and „Tego Wet 550“ with a high molecular weight.

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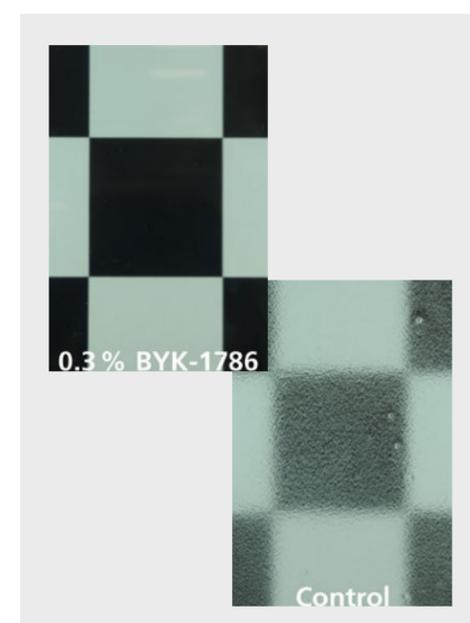
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ADDITIVES FOR WATER-BASED APPLICATIONS

Additives for water-based applications are the highlight of Byk's presentation at this year's ECS. One focal product here is the new defoamer, „Byk-1786“, which is a defoamer emulsion. The additive removes any micro foam that might appear in the coating with complicated application methods such as spray coating (HVLP), airless and airmix applications. This form of delivery enables the additive to be incorporated more easily and dosed better. It is especially recommended for pigmented and non-pigmented architectural coatings, general industrial, anti-corrosion, wood and furniture coatings, floor coatings, adhesives, sealants, care products, and polishes. The additive is VOC- and APEO-free and has no impact on transparency, haze, and cratering.

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TESTING

“A RELIABLE ASSESSMENT IN ACTUAL USE CONDITIONS”

Outdoor testing offers dependable data about biological performance



Dr Izzy Colon
Troy
Hall 7A, Stand 7A-125

Outdoor testing is time consuming in comparison to accelerated testing. However, it delivers much more reliable data. We spoke to Izzy Colon, senior vice president, science & technology, of Troy Corporation, about the latest insights into trends in field testing and its benefits.

What are the benefits of field testing to coatings manufacturers? Field testing provides a reliable assessment of the biological performance of paints and coatings in actual use conditions, which can include the growth of mould, mildew, staining and rot fungi, algae, and/or lichens. Proper field test procedures go a long way to ensuring that an optimum breadth of eventualities is accommodated and can substantially reduce the possibility of field failure. As a result, field testing is a necessary element in the evaluation of a dry-film preservative. This type of field exposure testing has proven to be the best indicator of performance in real world applications. Through our network of field testing sites, we can expose coatings to a diversity of climatic and microbial conditions, testing dry-film preservatives against as many scenarios as possible.

Since outdoor weathering is quite time consuming, accelerated weathering tests in the laboratory seem very attractive. Where do you see the limitations of these indoor solutions? Field testing is supe-

rior to laboratory evaluations in predicting actual performance in end-use applications, such as in exterior coatings applied to houses and commercial structures. Laboratory evaluations are beneficial in preliminary stages of product development as a screening tool. However, while laboratory evaluations are faster and less costly, they have considerable limitations. Laboratory evaluations do not account for numerous variables such as the nature and condition of the substrate, microorganisms encountered in actual use, or the time frame – in other words, the life of the applied coating. Additionally, using laboratory testing, it is difficult to simulate the migration and depletion patterns that occur in actual use.

What are the current trends on the coatings testing market? Many biocides suppliers rely on accelerated laboratory evaluations to estimate the expected performance of dry-film preservatives under actual field conditions. Unfortunately, such laboratory methods cannot take into account a variety of factors including: proper modelling of active availability over time; leaching effects under true exposure conditions; microbiological succession impacts; and most importantly, modelling of fungal-algal interactions that occur in nature but never in the laboratory. Therefore, field testing is the only way to provide proper dosing requirements for each climate and microclimate exposure scenario. Furthermore, such field testing must include extensive replication not only at each test location, but also at numerous test locations over a diverse climatic scheme. The level of investment required of a preservatives supplier is significant, both in time (typically three to five years for a full test evaluation) and capital expenses, including manpower requirements for frequent evaluations. As a result, extensive worldwide field testing at numerous climatically diverse sites is not common in the industry. Troy believes such investment is essential to move the

science forward. As an aside, paint manufacturers perform their own field testing – this is an established trend in the industry. However, paint manufacturers typically do not test for resistance to microbial growth; rather, they test for UV re-

sistance, chalking, and durability in applied paints. To speed this testing, paint manufacturers' test panels are typically oriented facing south. Unfortunately, optimal conditions for microbial growth are on north-facing panels, so

any data gathered by such testing is not helpful for microbiological evaluations and decision making. As a result, paint manufacturers typically rely on biocides suppliers like Troy who have extensive expertise and thoroughly developed

field testing programmes for the evaluation of microbial resistance of various dry-film products in their individual paints. 

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LEISURE TIME

ON THE ROAD IN NUREMBERG

Discover the ECS city

If you still have some time left over in Nuremberg, why not use it to stroll around the old town.

Nuremberg's landmark, the Kaiserburg, is visible from nearly everywhere. It is one of the most important castles in Germany and was first mentioned in written sources in 1105. The complex is currently undergoing extensive renovation, but the Kaiserburg Museum is still worth visiting. It boasts a captivating display on the architectural evolution of the Kaiserburg, its historical significance and the development of weaponry in the Middle Ages.

CHURCHES

Another prominent building in Nuremberg is the Lorenzkirche (Church of St. Lawrence). Together with the Sebaldkirche and Frauenkirche (Churches of St. Sebald and Our Lady), it is one of the three most impor-

tant churches in Nuremberg. The Lorenz organ is one of the largest in the world, with 12,000 pipes and 165 stops. The church's High-Gothic basilica stems from the 13th century while the impressive bell ringing is produced by 16 bells, the oldest of which date from the 14th century.

St. Sebald's church is the oldest parish church in Nuremberg, and also dates from the 13th century. It is surely unique in housing the relics of a Catholic saint – the church itself is Lutheran. Nuremberg's patron saint St. Sebald has found his final resting place in a reliquary there. This is one of the most important works of art in St. Sebald's and was created by Peter Vischer, a Nuremberg sculptor and redsmith.

MUSEUMS

Nuremberg also has plenty to offer to museum lovers. Whether you are interested in general history, urban his-

tory or art history, there is something for everyone. The "Dokumentationszentrum Reichsparteiengelände" (Documentation Centre Nazi Party Rally Grounds) is one of the city's many buildings that are steeped in history. Today, the site houses the permanent exhibition "Fascination and Terror", which deals with the causes, connections and consequences of Nazi tyranny. The former Nazi Party Rally Grounds still bear witness today to the megalomania of the Nazi regime. The large, unfinished congress hall planned by architect Albert Speer was designed to hold 50,000 people.

ART, CULTURE AND TOYS

In the "Albrecht-Dürer-Haus" (Albrecht Dürer's House), you can trace the life and work of Nuremberg's most famous son. This is the only surviving artist's house from the 15th century in Northern Europe. The renowned



painter, graphic artist and art theoretician worked there for almost 20 years. Like many other buildings in Nuremberg, it was damaged during the war but it was not destroyed. A particular highlight is the guided tours by an actress, dressed as Dürer's wife Agnes, who will show you around the living room, the kitchen and the painter's workshop.

The "Germanisches Nationalmuseum" (Germanic National Museum) provides an insight into the cultural history of the German-speaking world. The museum houses the former, late-medieval Carthusian monastery of Nuremberg. The museum houses roughly 1.3 million artefacts. A visit to the "Spielzeugmuseum"

(Toy Museum) is an unforgettable experience. Nuremberg has been a city of toys for more than 600 years. The Toy Museum owes its existence to the collecting passion of Lydia Bayer and her husband Paul. The collection comprises over 80,000 objects, ranging from dolls, tin figures, metal and wooden toys to more modern toys such as Barbie and Playmobil.

If you would like to discover more about Nuremberg itself, we recommend that you pay a visit to the city museum in "Fembo-Haus" (Fembo House) where you can immerse yourself in Nuremberg's history. The main building of Fembo House was the only one of all the historical burgher houses

in Nuremberg to survive the 2nd World War largely intact.

GUIDED TOURS

For more detailed, specific information about Nuremberg, you might try one of the many guided tours on offer. For example, there is a culinary tour that will take you on a journey through Franconian cuisine.

If you prefer to err more on the ghoulish side, then a ghost tour is surely right up your street. One of them promises to sweep you away on an underground tour beneath the cobblestones of the old town where you will learn a lot about the city's dark history.

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EATING AND DRINKING

CULINARY DELIGHTS IN NUREMBERG

Restaurant tips for Nuremberg

All ECS visitors will certainly find this familiar: there is so much to see, do and accomplish that eating tends to take a back seat. They eat on the go, grabbing a snack here, drinking something there.

But, ultimately, the ECS visitors don't eat a proper square meal. Anyone with time on their hands should explore through the countless restaurants that Nuremberg has to offer. A brief selection of these is presented in the following.

BÖHM'S HERRENKELLER

Böhm's Herrenkeller restaurant cleverly combines the traditional with the modern. In addition to traditional Franconian specialties, the menu features modern culinary trends. Here you can enjoy premium Franconian wines, the famous Franconian schäufele, regional products such as baked carp, Nuremberg bratwurst sausages and specialties from the grill.
Theatergasse 19
90402 Nuremberg
<https://herrenkeller.de>

KOCH UND KELLNER

Koch und Kellner opened its doors for the first time in July 1997 – the restaurant's philosophy can best be described as follows: simply enjoy. Original cuisine with matching wines, served up in a stylish ambience but relaxed atmosphere.
Obere Seitenstraße 4
90429 Nuremberg
www.kochundkellner.de

WÜRZHAUS

A restaurant where sophisticated, honest cuisine is married with a warm and friendly ambience. The kitchen run by Diana Burkel conjures up special culinary delights with no unnecessary frills. This philosophy is also replicated in the restaurant, which is plain but cosy. The dark, natural wooden furniture invites you to linger a while.
Kirchenweg 3a
90419 Nuremberg
www.wuerzhaus.info

ZWEISINN MEIERS I BISTRO I FINE DINING

ZweiSinn combines contemporary and authentic cuisine with regional and international ingredients. Strong emphasis on French-Mediterranean dishes.
Äußere Sulzbacher Straße 118
90491 Nuremberg
www.meierszweisinn.de

DAS PAUL

Cosmopolitan and close to home, trend-conscious and down-to-earth, smart and ur-

ban at any time of the day. The menu ranges from breakfast, lunch, coffee and cake, to evening cocktails at the bar.

Kaiserstraße 22
90403 Nuremberg
www.daspaul.com

KOKORO

This trendy restaurant serves up new interpretations of traditional Japanese cuisine. You will naturally also find the ever-popular sushi on the menu.
Luitpoldstraße 3
90402 Nuremberg
www.kokororestaurant.de

BOROBUDUR

Indonesian delicacies can be enjoyed in Borobudur. Indonesia has been a treasure-trove for international spice traders for hundreds of years. The "extravagant" use of spices and herbs is what gives traditional Indonesian dishes their unique and varied taste.

Allersberger Straße 145
90461 Nuremberg
<http://restaurant-borobudur.de>

CÔCÔ - INDOCHINE

In the style of Far Eastern cooks, this is where people meet to eat in a relaxed family atmosphere, share ideas and celebrate life. Enjoy the finest Asian delicacies and pure joie de vivre.

Augustinerstraße 1
90403 Nuremberg
<http://indochine.the-coco.de>

SHASHAMANE

Shashamane serves traditional Ethiopian food. The dishes are all prepared with authentic spices, which unfold their mild but perceptible spiciness rather slowly.

Willy-Brandt-Platz 4
90402 Nuremberg
www.shashamane.de

MISCHBAR

Mischbar offers a selection of fresh salads, fine soups and stews, exotic curries, various snacks as well as fresh juices and smoothies.

Hauptmarkt 2
90402 Nuremberg
www.mischbar.net

RED CURRY HOUSE

The Red Curry House makes its own curries. They are free of flavour-enhancers, artificial additives and flavours, and instead are made from regional and seasonal ingredients.

Lorenzer Straße 29
90402 Nuremberg
www.red-curry-house.de

ZEITLOS

In Zeitlos in Haus Eckstein, you can dive right into organic, fried sausages and organic wines. As a member of the "Qualitätsverbund Umweltbewusster Betrieb", the restaurant offers a seasonal menu with regional products exclusively sourced from the Nuremberg metropolitan region.

Burgstraße 1-3
90403 Nuremberg
www.zeitlos-im-eckstein.de

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