



EUROPEAN

COATINGS SHOW 2019

preview

The Show and Conference Preview – www.european-coatings-show.com – December 2018

A TRULY GLOBAL EVENT

European Coatings Show 2019 to feature an expanded exhibition area

Source: Heiko Stahl



Digitisation and automation have also become trends in the coatings industry, as could be seen at the ECS 2017.

Preparations are in full swing for the European Coatings Show 2019 (ECS), which takes place in Nuremberg, Germany, from 19 to 21 March. The ECS Conference will be held in tandem with the ECS on 18 and 19 March. The organisers are confident that the event will be hugely successful again.

The premier gathering of the paints and coatings industry will turn the spotlight on trends and technologies surrounding all aspects of the production of paints, coatings, sealants, construction chemicals and adhesives.

"The ECS 2019 will once again prove to be the world's leading coatings event," says Alexander Mattausch, ECS exhibition director. "As we were fully sold out in 2017, we have added an extra hall – hall 9 – which will complete the loop for visitors." Several major exhibitors, such as Huntsman, Ashland, Chemours and Worlée, to name just a few, have seized the chance to set up their stands in this hall. The list of exhibitors and the hall plans are already available online. "We are looking forward to a hugely successful European Coatings Show from 19 to 21 March 2019!"

"As well as more exhibitors, we are also expecting growth in visitor numbers yet again," adds Amanda Beyer, director event management at Vincentz Network and the show's co-organiser. "Especially the international appeal is ever growing. The ECS 2019 as well as its conference will be truly global events." Major challenges ahead: the ECS gives decision-makers and leading figures in the coatings industry an opportunity to meet innovation drivers and discuss the latest developments in pigments, additives, adhesives and raw materials, intermediates for construction

chemicals, as well as laboratory and production equipment, testing and measuring equipment, application and environmental protection and safety at work.

The most recent ECS in 2017 was the largest European Coatings Show to date. It boasted a further increase in exhibitor numbers (1,135 compared with 1,024 in 2015) and a new record of 30,198 trade visitors (2015: 28,481), as well as a larger exhibition area and peak figures for international participation.

For more information, visit: www.european-coatings-show.com

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EUROPEAN COATINGS SHOW CONFERENCE

ALL ANGLES COVERED

March 2019 sees Nuremberg once again becoming the meeting point for experts from the paints and coatings industry and allied sectors



Source: Helko Stahl

In addition to the trade show, the European Coatings Show Conference will feature more than 140 presentations by experts from all areas of the coatings industry. The conference programme will again be divided into 24 sessions, spanning a wide variety of topics.

The sessions on protective coatings, polyurethanes, epoxy coatings, architectural coatings, water-borne coatings, wood coatings, roof & façade paints, powder coatings and pigments will bring you up to speed in these classic coating topics. Other sessions will include construction chemi-

cal, testing & measuring, adhesives & sealants, printing inks, radiation curing, 2K industrial coatings and dispersing technology.

NEW TOPICS

New additions to the conference will be sessions on TiO₂ & opacification, microbial protection, and the EU-funded Foulprotect project. And perennial favourite "Science Today – Coatings Tomorrow" will offer a sneak peek into the future of coatings science.

THE PLENARY SESSION

The most outstanding conference paper will receive the prestigious European Coatings Show Award, sponsored by the European Coatings Journal. The award will be handed over during the plenary session.

PLENARY SESSION

Another highlight of the plenary session will be the keynote, to be given this year by Prof. Markus Antonietti, Managing Director at the Max Planck Institute of Colloids and Interfaces. Prof. Antonietti will discuss some modern approaches and processes for creating monomers, solvents, plasticisers, and even fully curable oligomer systems from wood-like waste products.

The full conference programme can be found at:

www.european-coatings.com/events/european-coatings-show-conference-2019



Source: Helko Stahl

The most outstanding conference paper will receive the prestigious European Coatings Show Award.

SUNDAY / 17 MARCH 2019

15.00 – 18.30 h Pre-conference tutorials

MONDAY / 18 MARCH 2019

8.30 – 9.45 h Plenary session: Welcome address, Conference introduction, European Coatings Show Award, Keynote presentation

10.00 – 13.30 h Parallel sessions 1-6
 Session 1: Science today - coatings tomorrow
 Session 2: Pigments
 Session 3: Powder coatings
 Session 4: Water-borne coatings
 Session 5: Roof & façade paints
 Session 6: Printing inks

13.30 – 14.30 h Lunch break

14.30 – 18.00 h Parallel sessions 7-12
 Session 7: Dispersing technology
 Session 8: Wood coatings
 Session 9: Foulprotect
 Session 10: 2K Industrial coatings
 Session 11: Microbial protection
 Session 12: Radiation curing

18.00 – 19.30 h After work reception

TUESDAY / 19 MARCH 2019

9.00 – 12.30 h Parallel sessions 13-18
 Session 13: Adhesives & sealants
 Session 14: Construction chemicals I
 Session 15: Polyurethanes I
 Session 16: Protective coatings
 Session 17: Testing & measuring I
 Session 18: Architectural coatings

12.30 – 13.30 h Lunch break

13.30 – 17.00 h Parallel sessions 19-24
 Session 19: Epoxy coatings
 Session 20: Construction chemicals II
 Session 21: Polyurethanes II
 Session 22: Protective coatings II
 Session 23: Testing & measuring II
 Session 24: TiO₂ & opacification

Conference programme

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CONFERENCE HIGHLIGHT

THOUGHTS ON SUSTAINABLE AND AFFORDABLE COATINGS

ECS Conference to open with a keynote speech by Prof. Markus Antonietti



The keynote speech signalling the start of the ECS Conference will be on the topic of sustainable and affordable coatings and coatings materials. Prof. Markus Antonietti, eminent director of colloid chemistry at the Max Planck Institute of Colloids and Interfaces in Potsdam, will deliver it on 18 March 2019.

The full title of the presentation is "Making coatings and coating chemicals more sustainable and affordable: biorefinery approaches to monomers, solvents, and polymers". Prof. Antonietti will give it at the conference plenary session on Monday, 18 March. "Public awareness of the health issues surrounding plastics ("microplastics", "endocrine disruption") and the long lifecycle of such polymer products have

placed the focus of research squarely on bio-based monomers and polymers which ideally will be less toxic, inert and even biodegradable," says Prof. Antonietti, who is also a full professor at the University of Potsdam, Germany. "A biorefinery based on lignocellulosic materials currently delivers bioethanol, sugars, and lignin as by-products, but such schemes can be readily widened to meet the needs of

the coatings industry, at a cost of less than 1 EUR/kg for most products." Prof. Antonietti will report on modern approaches and processes for creating monomers, solvents, plasticisers, as well as fully curable oligomer systems from wood-like waste products.



Prof. Markus Antonietti, Max Planck Institute of Colloids and Interfaces

PRE-CONFERENCE TUTORIALS

CONFERENCE WARM-UP

Ten tutorials will cover the basics and fill in the gaps



Once again, the European Coatings Show Conference will kick off with pre-conference tutorials hosted by experts from academia and industry.

On Sunday, 17 March, one day before the main conference programme starts, attendees will be given the opportunity to get up to speed in ten selected areas of

the paints and coatings industry. The tutorials will cover the following topics: basics of architectural coatings, polyurethane coatings, formulating adhesives and sealants; basics of anticorrosion coatings; understanding biocides and the latest regulations; dispersing pigments and fillers; functional coatings; radiation curing; epoxy coatings and environmentally benign coatings. They will then round off with a networking event in the evening for participants to meet up and connect with each other. Please note that registration for the tutorials is separate from that for the main conference.

CONFERENCE AWARD

REWARDING INNOVATION

ECS Award for the most outstanding conference paper

Curious to know who will win the prestigious European Coatings Award 2019? Then come along to the opening session of the conference on 18 March.

The ECS Conference 2019 will be awarding a special prize for the best submitted paper. At stake are EUR 2,000 in prize money and a commemorative trophy sponsored by the European Coatings Journal that will be handed over during the con-



Bas Tuijtelaaers received the European Coatings Award 2017 from Dr Sonja Schulte.

ference plenary session on 18 March. The award for the most compelling paper is selected beforehand by a jury of coatings experts on the basis of relevance, scientific content and degree of innovation. The European Coatings Show Award 2017 was won by Bas Tuijtelaaers and his team at DSM

Coating Resins in The Netherlands. They received the coveted prize for their findings on "Health risk-free resins for a better future, based on fatty acid modified polyurethane dispersions." The winners were announced by the editor-in-chief of European Coatings, Dr Sonja Schulte, who hosted the conference plenary session two years ago.

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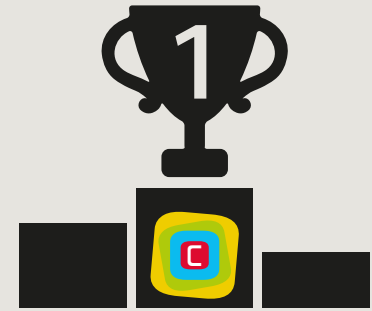
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The European Coatings Show in numbers

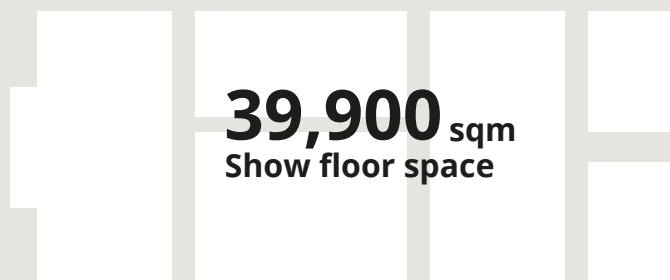
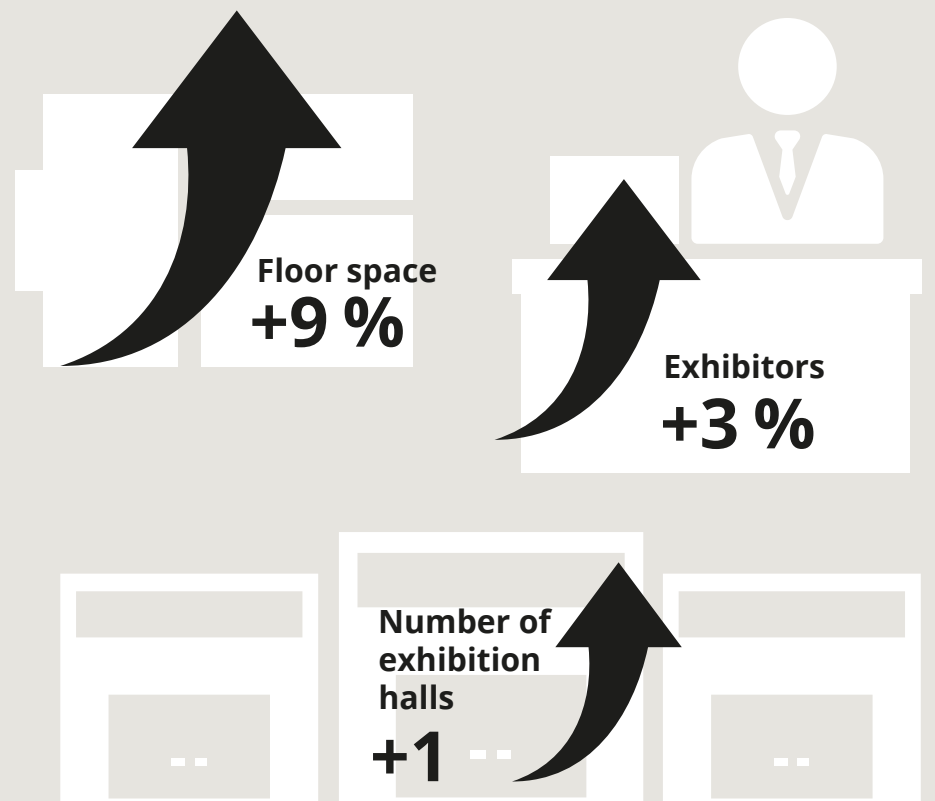
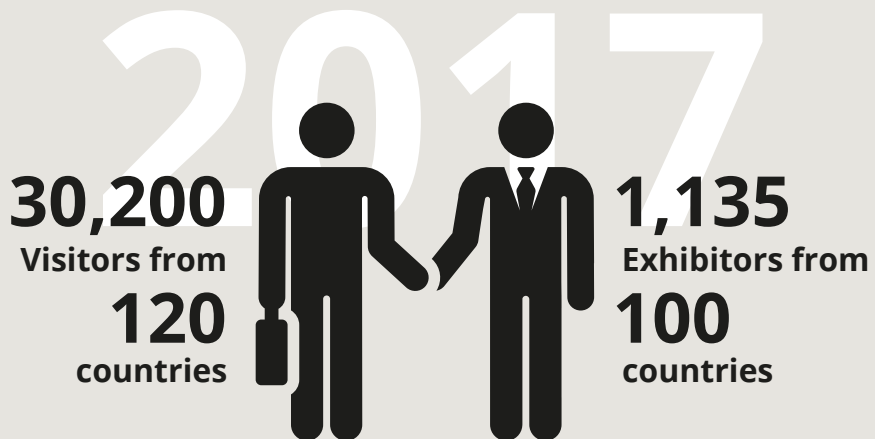


2019



The ECS has cemented its reputation as the must-attend event for the global paint and coatings industry, having grown non-stop since its launch in 1991. The upcoming ECS in 2019 is set to be the biggest-ever production of Europe's leading exhibition for the paints and coatings industry.

A like-for-like comparison at this stage of the preparations for ECS 2019 shows growth across a number of areas (as of November 2018).



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LEGISLATION

“REACH REGISTRATION MAY BE ONE OF THE BIGGEST HEADACHES FOR COMPANIES”

Focus on legislation: REACH and biocides

Kerstin Heitmann, Senior Expert Chemicals Management at Umco, warns that the end of the transition phase does not signal the end of your dealings with REACH. Regarding biocides, her colleague Gabi Büttner, Senior Expert Biocides, argues that the CLH process is purely hazard-based – the socio-economic impact of the classification is not taken into account.

The deadline for REACH registration ended in May 2018. What has to be done now? REACH registration may be one of the biggest headaches for companies, but it would be a disastrous mistake to believe that the end of the transition phase signals the end of your dealings with REACH. On the contrary, things only really get started then. All registrants are obliged to keep their dossiers current and to

update them when they receive new information on properties or uses.

What are the next steps? ECHA has announced that it will be starting a completeness check of dossiers in early 2019. Registrants are advised to regularly check for messages from ECHA in REACH-IT and to respond to any relevant requests. Substance-related assessments are already ongoing. Information on Community Rolling Action Plan and Risk Management Option Analysis can be monitored on the ECHA website. The relevant activities being pursued by the competent authorities are listed in the Public Activity Coordination Tool as well as in the substance info cards. The registry of intentions (RoIs) on harmonised classification, restriction or authorisation is available there as well. It is possible and, in some cases, also desirable for affected companies and industry representatives to

contact the competent authorities and to facilitate the whole process by contributing information. This should not only be understood as the task of the registrants but also, and more especially, as being in the interest of the downstream users, who are usually affected to a much greater extent by the measures. This is because the competent authorities often lack critical necessary information about the uses that would otherwise help them to implement measures in a targeted and proportionate manner from a socio-economic point of view.

What happens if a substance has not been registered before the deadline? Companies may continue submitting registration dossiers even after the end of the transition phase. Joint registration with data and cost sharing can proceed as before, too. However, such companies have been re-

quired to cease manufacture/import after 31 May 2018 and may only resume these activities once they have received a registration number. A registration number on a safety data sheet proves that the substance in question has been properly registered. However, as a downstream user, you should not expect all raw materials purchased in the EU to have registration numbers. That said, those which do not have one will be deemed REACH-compliant if your supplier can explain the absence of a substance's registration number in terms of an exemption, low tonnage, an inventory self-off, or an incomplete dossier that was submitted on time. If you are in doubt, however, you should request a declaration from him.

The use of biocides is still a hot topic. What is the current state of affairs? For years there has been



Kerstin Heitmann,
Umco



Gabi Büttner,
Umco

an appreciable shortage of suitable active substances for preservatives, the main cause of which can be traced back to the direct impact of harmonised classification within the CLH process. Since the CLH process is purely hazard-based and each active substance is considered separately, the socio-economic impacts of the classification on the entire industry are ignored. Preliminary results from the approval procedures provide for substitution (e.g. formaldehyde donors) or more stringent classification and labelling (e.g. SCL in the case of isothiazolinones) and that often leads to restrictions on use. The currently pending results for zinc pyrithione and MIT could serve as a pointer as to whether the current approach of adopting the stringent threshold values of the

CLH process will be retained or whether there will have to be a rethink.

What are the next steps? The demand made by associations to have all the active substances for a given type of product evaluated simultaneously so as not to lose sight of the full range of possible alternatives seems to have struck a chord – in Germany, at least. The German authorities concerned have signalled their willingness to look at this holistic approach. However, this merely marks the beginning of the debate, and the outcome is uncertain. For the time being, therefore, the industry is faced with the ongoing challenge of using combinations of the remaining active substances to cover a wide range of preservative applications. 

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UV CURING

“DUAL CURE CAN BE BASICALLY USED IN ALL APPLICATIONS”

Complying with regulations and technological trends

Tunja Jung,
BASF

Complying with regulations is not only a challenge for companies that are active in the field of radiation curing. It is also a chance to gain a competitive advantage, says Tunja Jung from BASF in our expert interview. She also talks about technological trends and dual-cure technology.

What do you think are the greatest challenges in UV curing at the moment? For me the greatest challenge is dealing with the rising tide of regulations in health, safety, and environment (HSE). In other words, the burgeoning requirements handed down by REACH, Swiss Ordinance etc. and brand owners. At the same time, this also creates opportunities for innovation and enhancement in UV technology. A further challenge is the availability of raw materials. There is a growing shortage of raw materials due to strong demand and positive economic developments in all regions.

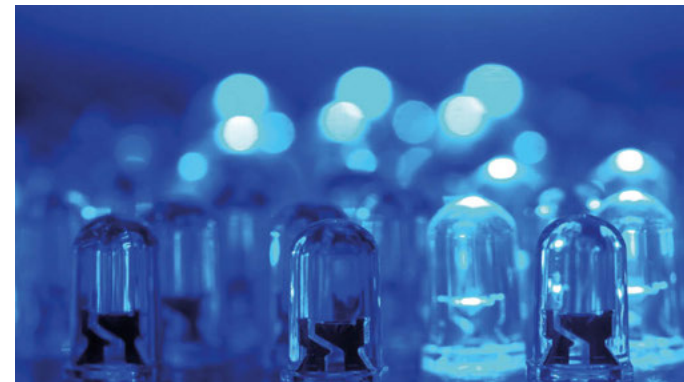
Some industry participants complain that regulation takes up so much of their time that there is barely any time left for innovation? Stricter regulations and a scarcity of raw materials are generally considered to be drivers of innovation. The rapid adjustment

of existing formulations to new requirements ties up a lot of resources. However, if formulations can be made to comply quickly with the new regulations, this also represents an opportunity to gain a competitive advantage. In future, the costs for adjustments will have to be borne increasingly along the value chain as far as the consumer, so that scope for ground-breaking innovations may be created. On the other hand, adaptation of existing formulations can also spawn innovations if it simultaneously leads to additional properties such as enhanced chemical resistance and the like. This situation applies not only to coatings and or printing inks manufacturers, but also to us raw material manufacturers.

Which specific issues are you referring to? REACH is a huge one, of course. The registration phase is now complete and the product evaluation phase is un-

derway. Every evaluation can signal a new product labelling situation and it is essential to adjust to the new situation quickly in order to take advantage of any new opportunities that arise

In the context of innovation, the topic of dual cure is also important, of course. How do you see this technology? The question is: what exactly is meant by dual cure? We understand it to be the UV-curing mechanism plus a second, different mechanism, which is usually triggered by heat. However, the mechanism of UV curing by means of free-radicals does not change, though. The thermal mechanism, for example, can also be triggered with peroxide free-radicals. But polyisocyanates, too, can be used to effect polyurethane crosslinking or to take advantage of totally



Source: demarco - stock.adobe.com

different combinations. In my experience, the first two combinations are the most common. Dual cure usually yields a combination of the properties of both systems. This is less a synergistic effect than it is the average effect of the two technologies. However, dual cure can compensate for the disadvantages of radiation curing, such as the poor curing

of very thick pigmented layers or of “shadow” curing. Dual cure can be basically used in all applications, whether in the furniture, flooring or automotive industries. While dual cure is somewhat more expensive, it has a positive cost-benefit ratio when it comes to compensating for the weaknesses I’ve just mentioned. ☺

PU COATINGS

ONGOING SHIFT TOWARDS SUSTAINABLE SYSTEMS

Water-borne PUDs, polyaspartic systems and bio-based feedstock

Christoph Irle,
Covestro

Less impact on people and the environment, greater profitability along the value chain: “We envision a tangible improvement in the sustainability of PUR coatings and adhesives over the coming years,” says Dr Christoph Irle, Vice President Coatings, Adhesives, Specialties, Application Development in the EMEA region at Covestro.

Which trends will be important for polyurethane coatings in the coming years? We envision a tangible improvement in the sustainability of PUR coatings and adhesives over the coming years: with less impact on people and the environment, and greater profitability along the value chains. The industry will have to address increasing global aware-

ness of sustainability, and comply with legislation and industry quality standards: reduction in VOC and CO₂ emissions, increased process efficiency, improved product safety and enhanced work-place hygiene. We expect global markets to continue transitioning from solvent-borne 2K-PUR formulations to water-borne polyurethane dispersions or polyaspartic systems and from mineral oil-borne coatings raw materials to bio-based feedstock. We will highlight several of these approaches during the ECS show and conference: our teams will be introducing improvements to existing technologies, as well as disruptive changes leading to entirely new solutions.

Which advances do you expect in hardeners for water-borne PU coatings in the coming years? Water-borne coatings and adhesives have proved to be a successful approach for reducing VOC emissions on a global scale. Therefore, we continue to keep investing in R&D to generate new solutions: at the upcoming ECS, we will introduce a new water-dispersible crosslinker, e.g. for furniture coatings, that marks a significant step towards faster curing and ultimately matching the process efficiency of solvent-borne systems. Besides that, the above-mentioned trends will

also be addressed in our product range of water-dispersible crosslinkers: with further-reduced content of monomeric diisocyanates and the use of building blocks based on renewable raw materials. We look forward to highlighting these innovative solutions on our stand at the show.

Which strategies for lowering the residual monomer content in 2K-PU systems do you consider promising? A constant improvement in quality and safety is a vital part of our product stewardship process. However, the specification of ultra-low content of monomeric diisocyanates in our hardeners has proved quite challenging for our production operations. We have learned that a specification for a maximum content of monomeric impurities of less than 0.1 percent requires that all our operations are properly prepared and set up and that they deliver best-in-class process consistency. Our organisation very much appreciated the efforts of our engineering team when we eventually reached our ambitious goal. Apart from “ultra-low monomer” crosslinkers, we are investing in the development of intrinsically monomer-free technologies, such as PU dispersions and silane-terminated PU systems. ☺

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photo 1 grinding stage

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photo 2-3-4 cleaning stage

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photo 5 washing stage

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photo 6 colour change stage

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“THE COLOURFUL WORLD OF COATINGS WILL BECOME EVEN MORE SPECIFIC”

Requirements and latest developments



Rolf Simon, Synthopol

What are the current trends in industrial coatings? The requirements imposed on coatings are becoming highly specific. Take the automotive industry, for example, where it's standard practice to keep changing colours and a tailor-made solution is sought for every component. Functionalities such as anti-scratch, easy-to-clean, intrinsic flame resistance or self-healing will cross over into everyday life and the colourful world of coatings will become even more specific. Not only do the colours need to be changed, but also the quality of the coatings.

The requirements imposed on coatings for industrial use are becoming increasingly specific, underlines Rolf Simon from Synthopol. In this interview, he discusses the latest developments in hardeners and the advantages of 2K coatings.

What developments are currently taking place in the field of hardeners? Unfortunately, still far too few, you might say at first glance. A closer look, though, reveals that some manufacturers have made enormous efforts.



Some have sought alternatives to polyisocyanates while others have produced polyisocyanates that have a very high content of renewable raw materials. Although that does not make the

products any healthier, it does conserve resources. The monomer content of many polyisocyanates has also been reduced substantially - to below 0.1% - without any appreciable change

in the technological properties of the applied coating. This means that paint shops can continue to work as usual despite the tightening of limit values.

Where do you see the main advantages of 2K coatings over 1K coatings? They save on time, energy and VOCs while delivering the best of quality. Or to put it another way, 2K coatings are used when, in the case of 1K coatings,

- > Drying is too slow
- > The chemical resistance is inadequate
- > The adhesion is not good enough
- > Weathering resistance is inadequate
- > The substrate for a stoving paint is not heat-stable enough (plastics, solder joints, dimensionally stable parts, wood and timber-derived materials, textiles...)
- > The object to be coated is too large for a stoving oven, or
- > Objects of continually varying geometry are painted

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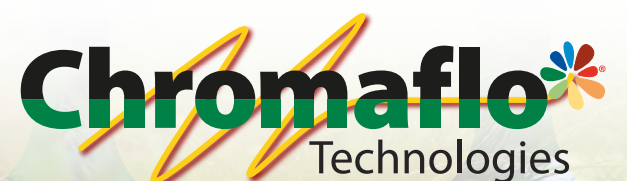
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EXHIBITOR VOICES

GATHERING POINT FOR THE INTERNATIONAL COATINGS INDUSTRY

What will be the focus of the upcoming European Coatings Show? We spoke to exhibitors about their expectations.

Questions:

1. Please describe your company in a few words. How is your enterprise related to the paints and coatings industry?
2. What products will you be presenting at the European Coatings Show 2019?
3. What are you looking forward to seeing/doing at the European Coatings Show?



Carlo Spaniol,
Olin

1. As the world's leading supplier of epoxy materials, Olin provides coatings solutions for a wide range of applications. Our growth is based on high-quality products, reliable supply, and dedicated customer service. We serve a diverse range of applications, including building and construction, civil engineering, powder coatings, protective coatings, marine coatings, aerospace, transportation, and many more.

2. For ECS 2019, Olin will be focusing on some aspects of its wide product range. We see rising demand for environmentally friendly and sustainable solutions. So, we will be promoting our VOC-free solutions in water-borne coatings,

powder coatings, among others. In addition, we will be highlighting efficient solutions for optimising the coatings' life-cycle costs. And you can expect some more.

3. We are looking forward to meeting potential and existing customers, not only in meetings, but also at our small reception on the first evening of the trade show. We're also keen to share information on trends and developments in the business. Overall, we hope to make people understand how our epoxy solutions can help support their business.



Birgit Prüter,
Synthopol

1. Synthopol is one of the leading family-owned resin producers in Europe and is located near Hamburg in North Germany. We develop and produce artificial resins, such as alkyd resins, acrylic resins, acrylic and PUR dispersions, and polyester resins, mainly for the coatings and adhesives industry. Our success is built on the competence, commitment and flexibility of our staff, innovative product developments and state-of-the-art facilities equipped with the latest technologies for customers worldwide.

2. At the European Coatings Show we are going to present a couple of new water-borne, high-solids and radiation-curable resins which meet ecological requirements on solvent reduction, but are made partly or wholly from renewable raw materials.

3. The ECS is an international platform for the worldwide coatings industry. It is the best source of information on trends and innovations and represents an opportunity to talk with many existing and potential customers about the current challenges of the market. We are looking forward to this unique event.



Atil Parikh,
20 Microns

1. 20 Microns Limited is India's largest producer of industrial minerals and possesses a diversified niche portfolio of next-generation specialty additives mainly aimed at the paints and coatings industry. We cater to a global clientele across 50 countries through ongoing innovation that enriches the sustainability rating of our customers and enhances their everyday lives.

2. We will be presenting a diverse range of mineral opacifiers as partial replacements for TiO₂; new generation of kaolins and high-brightness, high-aspect ratio talcs for superior coatings, as well as high-performance matting agents, thickeners and organoclays for next-generation coatings.

3. The ECS is a great platform for us to engage in detailed discussions with existing customers and to introduce them to our la-

test range of products. We are also keen to gain a better understanding of the ever-changing, demanding needs of newer customers on a global scale. The ECS provides a great opportunity to learn about emerging market trends and the latest constructive ideas for overcoming customer challenges.

production capacity. In February 2018, we approved the investment in two new chloride pigment production lines. We manufacture our high-performance pigments by both the chloride and the sulfate processes.

2. We will be promoting our range of high-performance TiO₂ pigments for coatings and inks. Our latest innovations are two chloride TiO₂ pigments, namely "Billions BLR-895" pigment and "Billions BLR-896" pigment for coatings. "Billions BLR-895" pigment is a versatile pigment that is suitable for water-borne and solvent-borne interior and exterior architectural coatings and can also be used in a wide range of industrial applications. It can deliver a brighter bluer white when compared with several competitor chloride TiO₂ pigments. The "Billions BLR-896" pigment has been specifically designed for durable heavy-duty industrial coatings that are permanently exposed to intense weathering.

3. The ECS allows us to meet a wide range of our customers in one place, both old and new. We're looking forward to talking to them about their issues and aspirations, to hearing their opinions, and to receiving face-to-face feedback about our performance. The ECS helps us showcase our business and our products and services to an increasingly global audience. 



Julie Reid,
Lomon Billions

1. Lomon Billions is an established and growing titanium dioxide pigment-manufacturing business with a strong and expanding global presence. We've been manufacturing TiO₂ pigment for 30 years and have four established ISO-certified TiO₂ pigment production sites in China. We currently have a manufacturing capacity of over 700,000 tonnes of TiO₂ pigment a year and we're ranked 1st in Asia and 4th in the world in terms of TiO₂ pigment



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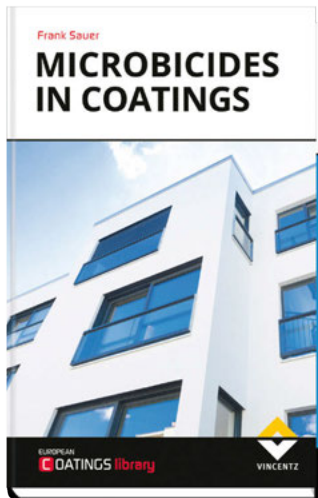
LITERATURE

THE JOY OF READING

Books bursting with coatings knowledge

Are you looking to deepen your knowledge of coatings or perhaps you are just embarking on your career? Books are a great way to gain an initial overview of a subject or to brush up your basic knowledge in a particular field. The range of books published by Vincentz Network covers the full panoply of coatings topics, a small selection of which is presented below. You will find more books and e-books at stand 360 in Hall 4 and in our online shop at

www.european-coatings.com/books.



MICROBICIDES IN COATINGS

Frank Sauer

All about biocides for coatings: When it comes to protecting coatings, it is essential to strike the right balance between germ control for avoiding economic damage on one hand and toleration of microbial life where necessary and useful on the other. This new book from Frank Sauer provides a comprehensive overview of the working mechanisms and possible applications of microbicides for coatings – it will prove invaluable for formulators and technicians as well as for business people with a basic knowledge of chemistry and biology.



POLYURETHANES

By Karsten Danielmeier, Peter Kruppa and Ulrich Meier-Westhues
2nd Revised Edition

This book has been fully revised and updated to reflect the latest scientific knowledge.

Polyurethane chemistry is hugely important in many applications around the world. Moreover, its development potential is by no means exhausted yet. New applications are continually being identified and the product range further expanded.

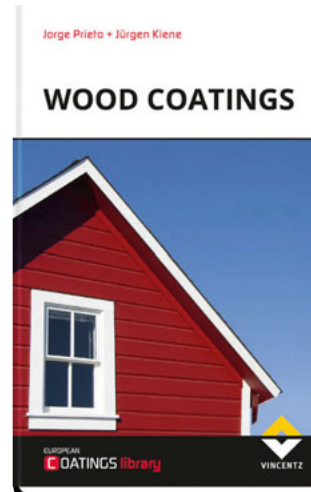
This fully updated version of the 1st edition will be published in February 2019. It starts by exploring the principles behind polyurethane chemistry that enable the reader to understand the current significance of the various applications, special developments and future prospects discussed in subsequent chapters.

Newcomers will find the information within this book extremely useful for familiarising themselves with the key concepts behind polyurethanes. And, for specialists, it will be invaluable for updating their knowledge of current developments and future prospects.



Gisela Gehrenkemper,
Editor European Coatings
Library

“Our wide-ranging catalogue enables you to plunge deep into the world of basic and expert knowledge and find out more about those topics which are currently making waves in the coatings arena.”



WOOD COATINGS

Jorge Prieto and Jürgen Kiene

Tap into the wealth of knowledge underpinning industrial wood coatings! This comprehensive standard work from Jorge Prieto and Jürgen Kiene focuses on interior and exterior coatings for wood and wood-based materials. It compares classic solvent-borne wood coatings with modern UV-curing and water-borne systems. It also offers detailed guide to formulations and current coating procedures. In summary, this book provides a comprehensive overview, with practical solutions and support for everyone involved in industrial wood coatings.



FILM FORMATION

Peter Mischke and Bernd Strehmel
2nd Revised Edition

From the various application methods and physical aspects of drying to basic polymer and physical chemistry through to the fundamental principles of film formation: this second, revised edition from Peter Mischke and Bernd Strehmel addresses all the multi-faceted aspects of film formation. This easy-to-understand volume is aimed specifically at students, newcomers, career-changers and experts within the coating materials industry. Not only does it provide important in-depth information, but it also offers required reading on current topics!



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TRENDS AND CHALLENGES

“MOVING FORWARD, DIGITISATION WILL BE CRITICAL FOR THE PAINT AND COATINGS INDUSTRY”

Innovation drivers for the coatings industry

“Both coatings manufacturers and their customers want innovations that reduce their environmental footprint and impact their bottom line,” says David Bem. The Vice President, Science and Technology and Chief Technology Officer of PPG talks about overall trends, challenges and innovation drivers for the coatings industry.



David Bem,
PPG

What, for you, are the current innovation drivers in the coatings industry? Customer demand is of course always one of the greatest drivers of innovation, as it is customers who increasingly demand functionality from paints and coatings. Right now, the call for sustainability is probably the main innovation driver. Both coatings manufacturers and their customers want innovations

that reduce their environmental footprint and impact their bottom line and so we are working to achieve this through advanced processes and products.

Where are the overall trends in the coatings industry, in your opinion? Trends in the coatings industry often correlate with those in the world of technology. This can be seen in the rise of autonomous and electric vehicles and how this is driving PPG to create the advanced coatings needed for facilitating the development and deployment of such vehicles. These products include exterior coatings that will enhance vehicle visibility, improve overall reliability and enable safety, including light detection and ranging (LIDAR) systems; easy-to-clean coatings that help prevent obstruction of autonomous-vehicle sensors and deliver a clean

experience for shared vehicles; and environmentally sensitive cathode and anode coatings for storing and transferring energy within modern lithium ion batteries.

What do you see as the main challenges for coatings producers? Manufacturers are experiencing an increased technology pull from customers and so we expect investment in R&D to continue at a healthy pace in 2019 and beyond in order that this challenge may be met. PPG is one of the largest coatings companies and has a strong track record of innovation that enables us to develop the next-generation solutions demanded by our customers. Recently, we've addressed optimisation of customer application and improved functionality, with products such as „Olympic SmartGuard“ stain in a pouch, a battery-powered aerospace sealant dispensing tool and a low-energy paint process for automotive original equipment manufacturers (OEMs). A tightening labour market is also impacting on the manufacturing industry overall. Advanced manufacturing requires advanced STEM (science, technology and mathematics) skills and, at PPG,

“Manufacturers are experiencing an increased technology pull from customers and so we expect investment in research and development to continue at a healthy pace in 2019.”

David Bem



Digitisation has an increasing impact on the paints and coatings industry.

we are committed to educating and inspiring the next generation of manufacturers about the many opportunities available in our field.

How would you rate the importance of digitisation for the paints and coatings industry? Moving forward, digitisation

will be critical for the paint and coatings industry. It's all about 'online' and 'on-demand' right now. Customers seeking DIY services are driving the importance of digital services that enable a start-to-finish process: order the paint, choose a colour and paint a room. And it isn't just the consumer audience: the industry too

is expanding its offering of colour matching and digital application tools for professionals, and so is enabling greater productivity in coatings applications. PPG believes that digitisation will continue to be a primary focus in the paint and coatings industry, just as it is in the food and transportation industries.

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DIGITISATION

“GATHER AS MUCH INFORMATION AS POSSIBLE”

Companies that want to stay ahead of the competition have to think about digitisation

Digitisation of manufacturing processes is transforming many industries in a way and at a pace that can be scary. However, there are huge chances for increasing efficiency and product quality. We spoke to Norbert Kern, Head of Product Management and Process Engineering for Grinding and Dispersion at Bühler AG, about the future of paint manufacturing and the power of data.



Norbert Kern, Bühler

In the case of fully continuous processes, we also need inline product information. For this, we have systems which can be integrated into the product stream. For example, we have inline systems for measuring viscosity, solids loading, density and even particle size. Bühler has already deployed these systems in other industries, such as lithium-ion battery manufacturing, and we are now transferring them to the paints and coatings industry.

If a paint manufacturer wants to start digitising his manufacturing process, where do you think he should start? First of all, end-product quality depends not only on the processing parameters but also on the quality of the raw materials. For complete traceability and the ability to analyse and optimise the manufacturing process, it is essential to have all the information at one's fingertips. When we know what we are supplying and how we do our processing, we

are in a position to understand how end-product quality evolves. We start by gathering as much information as possible from the manufacturing process. That includes all the key processing parameters. Then, we gather data on the product. This typically entails gathering information about the quality of the end-product. Then we add more information about the supplied raw material. The more data we have, the better we are able to visualise and interpret it.

Just collecting data in paints and coatings manufacturing is one thing. But how difficult is it to interpret the data and learn from it? This is where the real expertise comes in. Understanding the process is straightforward with the aid of our visualisation tools. These include, for example, a pie-chart for visualising error messages or correlated process data for each alarm. There are also options for comparing different product batches so that the customer can identify the

most important process parameter in manufacturing. All of this information goes into optimising one location. However, there are also options for internal benchmarking across different locations of the same paint manufacturer. We can even go one step further and curate the information for industrial benchmarking. In that event, the paint manufacturer would see be able to how the efficiency of his manufacturing process compares with that of others in the same industry.

We have developed different levels of data collection and analytics:

1. Smart Pro Cockpit: data collection for full traceability
2. Smart Pro Statistic: long-term statistics for consistently high quality
3. SmartPro Optimisation: algorithms for automatic process optimisation

Bühler offers cloud solutions for handling production data and performing data analytics. How do you address security issues for this service? Data secu-



Source: Mornius - adobe-stock.com

ity and safety is a very important topic. To ensure that our customers have the latest digital services, we are continually working on developing our solutions. We are applying for ISO 27k certification and are cooperating with Microsoft on the latest data security technologies. A strong partnership and common understanding of data security is key to success. We believe that the only sustainable solution for staying up to date is a cloud-based one. The latest information and

algorithms for data analytics are then always available and the customers are able to derive the maximum profit from the system. This is important, as the technology in this field is constantly evolving. We are also able to offer our customers an in-house server solution. In this case, the data stays inside the company only. However, there are then limitations surrounding data analytics and visualisation, as most of these solutions run in the cloud.

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14 INTERVIEW

ARCHITECTURAL COATINGS

“MAKING A VIRTUE OUT OF NECESSITY”

Trends and challenges in R&D activities

Ongoing shortages in key coatings raw materials dictate the R&D activities of both coatings manufacturers and raw material suppliers, says Ludger Kueper, Commercial Director Coatings EMEA at Ashland Industries Europe.



Ludger Kueper,
Ashland

What are the current trends in architectural coatings? The current trends in architectural coatings are very much affected by the need to make a virtue out of necessity. Ongoing shortages of key coatings raw materials such as titanium dioxide, certain monomers, silicones and biocides are nowadays dictating the R&D activities at coatings manufacturers as well as on the raw material side. This is also going hand in hand with the trend towards smoother and smoother surfaces. The key challenge is to strike the best balance between a super-smooth surface and a perfectly stable paint formulation that does not spatter at all.

What benefits do the latest raw material solutions offer here? The best solution is a combination of hydrophobically modified HEC (HMHEC) with non-ionic associative thickeners (NSAT). HMHEC helps the desired reductions in pseudoplasticity to be achieved thanks to its reduced molecular weight and hydrophobic modification. The correct choice of NSAT will supply the desired additional newtonian behaviour, which in turn will bring better levelling, leading to a smoother surface and thus the desired improvements in applied hid-ing. Both chemistries also

work nicely in high-pH paints, reducing spatter drastically or even to-tally eliminating it in some cases.

To what extent are current and upcoming regulations challenging R&D in architectural coatings? The global legal and regulatory environment presents a very real challenge for the whole industry and will certainly continue to have a major influence. The crucial question for all formulators will be which raw materials they can continue to use going forward. The new European biocide regulation is a good example. Reducing the MIT level down to a maximum of 15 ppm, or even ban-ning MIT completely, will inevitably require re-formulations. Alternatives such as a combination with zinc pyrothione are already under discussion in the Scandinavian market. A return to for-maldehyde releasers is also not a feasible option. The most logical way forward would also make a good sustainability slogan: “Do more with less” – a challenge that will remain with us for the next decade.



Source: Tiberius Gracchus - Fotolia.com

MARKET

IMPACT OF BREXIT ON THE UK AND THE EU 27

Looming Brexit is creating uncertainty across Europe



Ellen Daniels,
British Coatings Federation

Ellen Daniels, head of public affairs and policy at the British Coatings Federation (BCF) outlines the possible consequences of the UK's intended departure from the European Union. She believes that, unless a mutually favourable deal is agreed, the paint and coatings industries in both the UK and other EU 27 countries will suffer.

The UK and EU coatings industries' supply chains are heavily interconnected and, because of this close working relationship, the industry has grown exponentially over the years and simultaneously witnessed the development of innovative technologies as a result of close collaboration between the EU 28.

The UK's intended departure from the EU has created uncertainty on both sides of the Channel. Europe is a key market for the UK paints, coatings and printing inks industry, which comprises over 60% of UK exports, whilst 80% of paint and ink imports to the UK are from the EU. 50% of BCF members are British, with the rest predominantly owned by European, American and Japanese parent companies, the vast majority having UK manufacturing facilities.

The Chequers Proposal, published in July, outlined the UK's negotiating stance and the Prime Minister's ambition to have the UK stay within the European Chemicals Agency. If the UK chemical regulations were to deviate from those on the continent, this would result in severe disruption for the industry. CEPE and BCF's boards have agreed a joint position outlining our ideal outcome from the negotiations:

> A customs union or agreement between the UK and the EU to ensure frictionless

trade, avoiding potential delays and disruption to the industry.

> A harmonised chemical regulatory framework between the UK and the EU, including REACH, BPR and CLP

> No deviation in the UK from the high level of environmental and safety standards of products that currently exists in the EU

> 0% tariffs on finished goods (paints, coatings and inks) and raw materials for our industries which are traded between the UK and the EU

> The free movement of skilled workers between the EU 27 and the UK

The implementation of tariff and non-tariff barriers on paints, coatings and printing inks products will reduce trade on both the continent and in the UK. Furthermore, innovation, competitiveness and economic growth will also suffer. Unless a mutually favourable deal is agreed, the industries in both the UK and other EU 27 countries will suffer. Whilst UK has a trade surplus with many countries in the EU, overall imports and exports for paints, coatings and printing inks are at a similar level – so both sides will lose if there are barriers to trade. The implementation of tariffs of 6.4% on our products will impact both sides of the channel, making the UK less competitive as a country to manufacture in, compared to other countries in Europe.




Source: Kristina - adobe-stock.com

“Europe is a key market for the UK paints, coatings and printing inks industry.”

Ellen Daniels

Given the increasing uncertainty regarding the future relationship between the UK and the EU, the UK Government has increased its level of planning for a possible “no deal” scenario. In September and October, it published a series of Technical Notices, detailing plans for chemical regulations in the event of

a “no deal”. Whilst we welcome this, the Technical Notices require more detail, in order for businesses to plan more effectively for a “no deal” Brexit. The BCF is currently working closely with the UK Government to ensure a good outcome from Brexit negotiations that will, it is hoped, keep the

UK within ECHA, REACH, CLP, BPR etc. However, given the direction the negotiations are taking, we are keen to make sure that members are fully informed and prepared for any outcome. 

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AUTOMOTIVE COATINGS

“THERE IS HUGE POTENTIAL FOR ENERGY SAVING”

Automotive coatings can help to reduce the carbon footprint



Makoto Nishigami,
Asahi Kasei Europe

Activities to reduce CO₂ emissions are ongoing globally, according to Makoto Nishigami, Marketing Manager Performance Coating Materials at Asahi Kasei Europe. The development of water-borne systems featuring an equivalent or even better performance in automotive coatings is very important. Future trends in mobility will also affect car usage and the coatings employed.

Do you see developments that could lower the energy consumption of automotive coatings? Activities to reduce CO₂ emissions are ongoing globally. Against that background, we believe there is huge potential for energy saving in respect of automotive coatings as well. One method that we see is the use of a low-energy drying process for integrated painting of composite materials with the car body. With this goal in mind, we are currently developing a blocked isocyanate which can be cured, as well as a low-viscosity isocyanate which helps to enhance the appearance even when lower process temperatures are used.

What are the hurdles in the way of returning to more water-borne systems in automotive coatings? The development of water-borne systems featuring an equivalent or even better performance as that of current solvent-borne systems is very impor-

tant, but at the same time it is also very difficult. One of our focuses is on developing a new product that can contribute to achieving the same performance level.

Where do you see the largest potential for even more sustainable automotive coatings? As a manufacturer of coating materials, we believe that raw materials for coatings which contribute to a reduced carbon footprint will be received very well by the market. For automotive manufacturers, this would be an important step towards achieving a zero-emissions manufacturing process.

What impact do you expect trends like electric cars and self-driving vehicles to have on the automotive coatings industry? As artificial intelligence technology continues to improve, car usage will shift from privately owned cars to shared cars. As car sharing grows in popularity, one



Source: VPalles - stock.adobe.com

car will be used by many different users. This development will increase the demand for coatings which help to improve long-term durability against scratches and

to keep the car body in a clean and attractive condition. At the same time, we are seeing a decrease in demand for colour variations. This development may

provide a chance for wrapping film around the car body, because it can be replaced and therefore scratches can be easily removed.

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SUSTAINABILITY

“COATINGS ARE JUST AT THE BEGINNING OF THE CIRCULAR ECONOMY S-CURVE”

Role of the coatings industry in the circular economy is hugely underestimated

The huge contribution which the coatings industry can make to carbon-reduction targets should not be underestimated, says André Veneman, Corporate Director Sustainability at Akzo Nobel. Unlike the more traditional chemicals industry, the coatings industry is just at the beginning of the circular economy S-curve. Veneman explains what he means by that in this short interview.

To what extent has the paint and coatings industry embraced the circular economy? Role of the coatings industry in the circular economy is hugely underestimated. People tend to think that coatings companies have a very small carbon footprint. This may be true for our own operations, but the emissions associated with the raw materials bought in by the coatings industry – pigments, resins and solvents – are substantial. Likewise, the applications provided to consumers also generate very substantial emissions, e.g. from solvents and curing temperatures. The cradle-to-grave carbon footprint of the coatings industry is in many cases bigger than that of the more traditional chemicals industry. So, the huge contribution that the coatings industry can make to carbon-reduction targets should not be underestimated. Several years ago, the more traditional

chemicals industry understood its role in the energy transition. The industry passed through an S-curve: beginning with small, renewable-energy start-ups, moving to scale-up with major companies implementing renewable energy on a large scale, to driving a full-scale renewable energy transition. The coatings industry will have to pass through a similar S-curve, not in terms of energy efficiency but rather in terms of resource productivity and circular use of materials.

Where do you see further potential for the circular economy to be implemented in the paints and coatings industry? When we source raw materials, we will have to join forces with our suppliers to sharply increase the share of bio-based materials and recycled content and we will have to learn to make better use of such materials. More importantly, we should offer our customers technologies and solutions that enable them to reduce emissions and material use, for instance with lower curing temperatures, low or zero solvents, and fewer layers. But above all, it's about better performance, durability and long-term protection of the underlying substrate – wood or metal – and products that reflect heat, reduce fuel use and friction, or create insulating capacity. It's also about solutions being non-hazardous and thus enabling the



André Veneman, Akzo Nobel

underlying products such as furniture, transport or building materials to be reused and recycled. Coatings should be an enabler for not turning products into waste.

Where do you see the biggest challenges in this regard? The energy-intensive industry has already passed through the energy S-curve – and the coatings industry finds itself just at the beginning of the circular economy S-curve. The coatings industry as a whole has to start increasing its share of bio-based and renewable raw materials, too. Too often we hear that customers are not calling for this or that bio-based is more expensive, but there simply is no alternative pathway if we want to stay on track to satisfy the Paris climate agreement and the UN SDGs. Those frameworks are imperative for the coatings industry. We have to keep experimenting



Source: Romolo Tavanti - stock.adobe.com

with different kinds of renewable raw materials and to develop products that are free of hazardous substances and solvents, while factoring reusability and recyclability into all the industries that our products serve. This will definitely become a differentiating factor in the coatings industry. The volume of bio-based coatings is already growing in Europe: over 1 million tonnes of bio-based materials are being produced today and at a very attractive growth

rate. As a leading company in this area, we are definitely at an early stage, but we are also at the forefront in our ventures with major suppliers and universities to develop innovative products. Examples are premium-quality coatings with 25 % recycled content, our collaboration with Black Bear to generate carbon black from old tyres, and joint research with Dutch universities as part of the Chemical Building Block Consortium for developing bio-based re-

sins from crustaceans and wood. We have gone through the trials and pilot-testing phases and are now about to will accelerate our pathway to resource productivity and circular economy. The Paris climate agreement and circular economy are very relevant to our industry and will force our suppliers to move away from fossil-based products. This will become a major differentiator for our industry – now is the right time to accelerate the transition. 

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The popular Product Presentations sessions are intended to arouse visitors' interest by providing an overview of novel coating products. The exhibitors queue up to deliver short presentations on their latest offerings, and have just 15 minutes to present information about the development, performance and technology behind their products. Not only will they focus on the new develop-

ments themselves, but they will also expound on market trends in their respective areas. After their presentations, they will be available for brief discussions with attendees.

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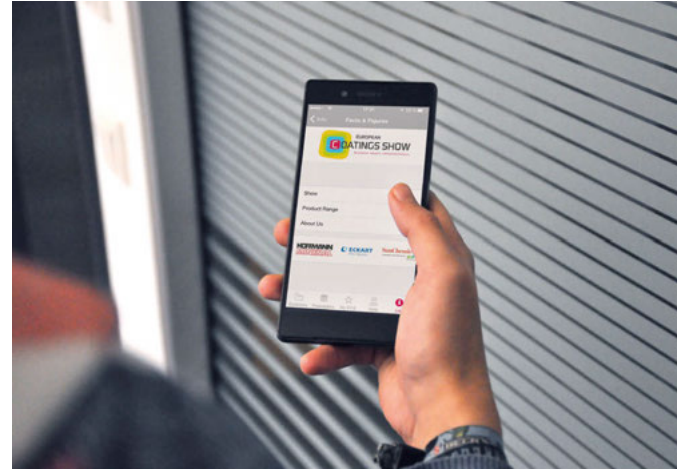
There is no admission charge to the Product Presentations, and

ECS visitors are free to drop by at any time – registration is not necessary. An overview of the presentations will be posted shortly afterwards on the European Coatings Show website. Exhibition visitors will also be able to access them online after the exhibition.

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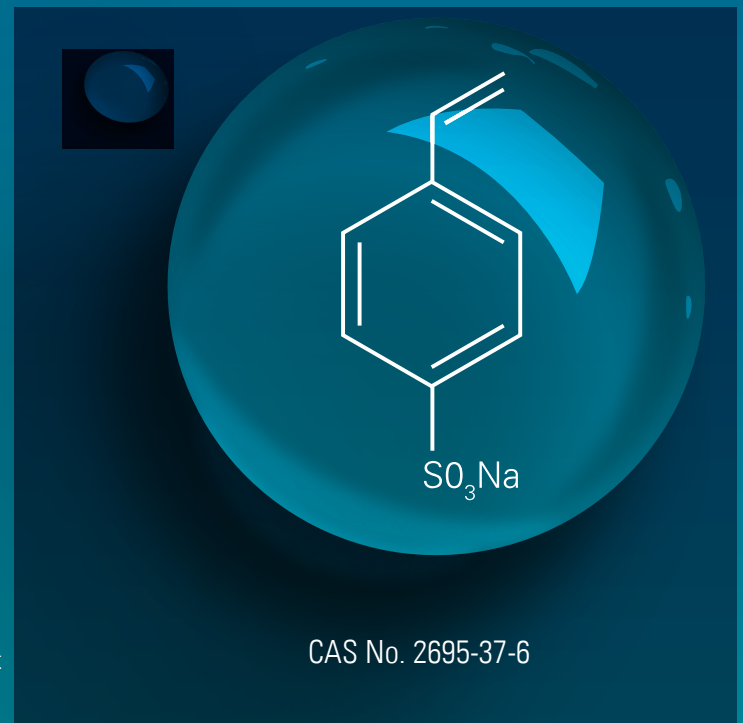
Dispersant



Water Treatment



Antistatic Agent



AT A GLANCE: TICKETS AND OPENING HOURS

European Coatings Show

Opening hours

Tuesday and Wednesday:	9.00 - 18.00 h
Thursday:	9.00 - 17.00 h

Exhibition entrance tickets

1-day ticket	€ 55
Permanent ticket	€ 75

Visitor tickets obtained in advance are automatically allocated a free VGN (Greater Nuremberg Area Transport Authority) combined ticket enabling you to use all public transport in the Nuremberg/Fürth/Stein area free of charge.
Free admission for trainees and students from the coatings industry on presentation of suitable proof.

Online ticket shop

Entrance tickets can be ordered via the internet:
www.european-coatings-show.com/tickets

Visitor information

NürnbergMesse GmbH
T +49 911 8606-4900
Fax +49 911 8606-4901
visitorservice@nuernbergmesse.de

European Coatings Show Conference

Opening hours

Sunday (Pre-conference tutorials)	15.00 - 18.30 h
Monday	8.30 - 19.30 h
Tuesday	9.00 - 17.00 h

Full conference

18-19 March 2019: (exclusive Pre-conference tutorials)	
Standard fee	€ 1,500
Early-bird fee (until 31 January 2019)	€ 1,400
Reduced fee*	€ 1,265
University members	€ 700

Single day ticket

Standard fee	€ 995
Reduced fee*	€ 880
University members	€ 490
Pre-conference tutorials	€ 475

Livestream

Full conference livestream	€ 370
Single-day livestream	€ 210

Register online:

www.european-coatings.com/conference

* Discounts

Companies exhibiting at the European Coatings Show 2019 or members of EuPIA and PRA will be given a 10 % discount of the standard fee

Fees include

- Admittance to the conference day booked
- Conference proceedings
- List of attendees
- Luncheon & coffee breaks
- Permanent exhibition ticket
- After work reception
- Welcome get-together

Information on the conference:

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THINKING OF TOMORROW

AFTER THE SHOW

ALWAYS WORTH A VISIT

Tips for a relaxing end to the ECS or getting to know Nuremberg better

Care to unwind in Nuremberg after an exhausting day at the European Coatings Show? Go on – it has plenty to offer besides the ECS.

Whether restaurants, museums, guided tours or entertainment – after a day packed with appointments at the European Coatings Show, there is something different for everyone to experience far removed from the world of coatings. Nuremberg's picturesque old town, peppered with half-timbered houses, is really worth strolling around. The *Kaiserburg* (Imperial Palace), which is visible from afar, is a particularly striking landmark.

Nuremberg is famous all over Germany for its small fried sausages, also known as *Nürnberger Rostbratwürstchen*. This Franconian speciality has been around for about 700 years. The official recipe for the small sausage was first decreed by the free imperi-

al city Nuremberg back in 1313. You can enjoy them in most of the city's countless restaurants. Here are just two to choose from:

Behringer's Bratwurstglöcklein: Here, set in original convivial Franconian surroundings, the tasty *Nürnberger Rostbratwürstchen* are served up on tin plates and are made in the in-house butcher's.

Bratwurst Röslein: The world's largest Bratwurst restaurant is located in a beautiful backyard behind the town hall and also has a long tradition. It too serves delicious Bratwurst in the customary style.

But there are Nuremberg delicacies other than simply Bratwürstchen to try out – for example: pretzels. True, these do not come from Nuremberg, but they are becoming increasingly popular in Bavaria's second-largest city.

The *Albrecht-Dürer-Stube* is a 450-year-old half-timbered establishment that is also a great

place to end the day with Franconian dishes.

OLD TOWN AND HISTORY

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. All Holy Roman and German emperors resided there, at least intermittently, from 1050 to 1571. 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.

The *Handwerkerhof* (craftsmen's courtyard) in the shadow of Nuremberg's historic walls is the city's former weapons



The Albrecht-Dürer-Haus is located in the old town of Nuremberg.

yard. It was built to celebrate Albrecht Dürer Year in 1971. This small town, set in the midst of the big city, gives you a chance to watch craftsmen at work. The traditional handicrafts practiced in the *Handwerkerhof* include gingerbread making, leather processing, glass painting, glass engraving, pottery, tin casting, pyrography and goldsmithing. 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 important 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 museum lovers. Whether you are interested in general history, urban history or art history, there is something for everyone.

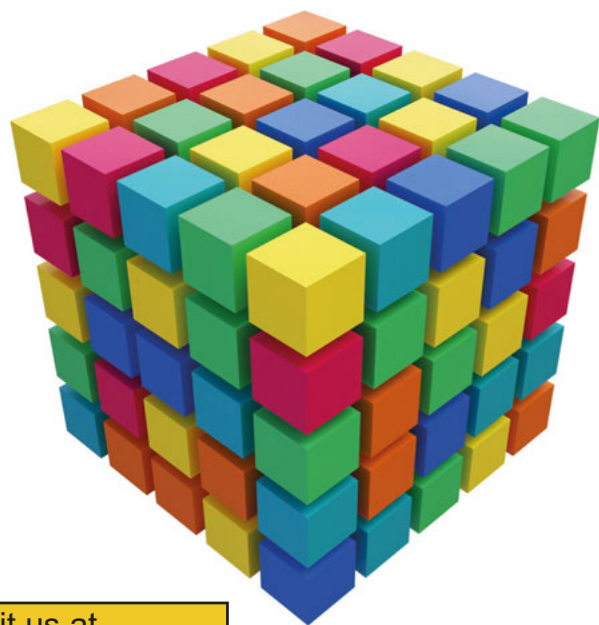
The *Dokumentationszentrum Reichsparteiengelande* (Documentation Centre Nazi Party Rally Grounds) is one of the city's many buildings that are steeped in history. Today, the site houses the permanent exhibition "Fascination and Terror", which deals with the causes, connections and consequences of Nazi 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. 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. The Graphics Cabinet on the 3rd floor houses changing exhibitions and the abundant holdings from the city's art collections. The painting and printing workshop arranges demonstrations of artistic techniques from Dürer's lifetime. 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* (German 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. With its roughly 1.3 million artefacts, this museum is the largest cultural history museum in the German-speaking world. 

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Masthead

European Coatings Show Preview

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INSTITUTES AND UNIVERSITIES

ACADEMIA MEETS BUSINESS**Information on research topics and study programmes**

The European Coatings Show 2019 will also welcome representatives from several institutes and universities.

Amongst others, the University of Applied Sciences Niederrhein, the University of Paderborn and the Fraunhofer Institute for Manufacturing Technology and Applied Materials Research (IFAM) will have their

own stands at the ECS. The University of Paderborn will be presenting the following topics: microphase-separating block copolymers with anti-fouling properties, the development of coatings with self-repair properties, hierarchically structured coatings, structured coatings with barrier effect, and bio-based and bio-inspired coatings. Esslingen University of Applied Sciences is well known in the

sector. It will be presenting its bachelor's course in chemical engineering/paints and coatings at the ECS. Interested parties will be able to find out more about the course and receive detailed information at first-hand.

The Institut für Holztechnologie Dresden will also have a stand and will be presenting on a number of topics, including: development of an NIR-based method for rapidly predicting the weatherability of wood coatings in outdoor areas (SurveNIR Coating), development of a method for the early detection of weather-induced failure of plastic coatings, and natural binders. The Fraunhofer Institute for Silicate Research (ISC), too, will be in attendance again at ECS 2019. Its topics will include multifunctional, bio-based and biodegradable multifunctional coatings, additives, design-for-dispersion and pilot syntheses of nanoparticles.



Several institutes and universities will present themselves at the show.

FEATURES

OFFERINGS OLD AND NEW AT THE ECS**More floor space, stronger Wifi**

In 2019, the European Coatings Show will once again premiere a few new features alongside those which are already firmly established.

The European Coatings Show 2019 will be bigger than before, with exhibitors allocating even more floor space than before, because an extra hall – Hall 9 – is being added. What's more, the Wifi network is being built out further.

A large number of innovations were already launched at the European Coatings Show 2017, including a new, faster admission system, an electronic ticketing system, and an electronic version of the exhibitors catalogue. Once again, there will be an after-work meeting for all conference attendees on Day 1 of the conference. It



The Wifi network for the ECS is being built out further.

will be held in the conference building when the sessions are over.

For more on this, visit the official site at: www.european-coatings-show.com.

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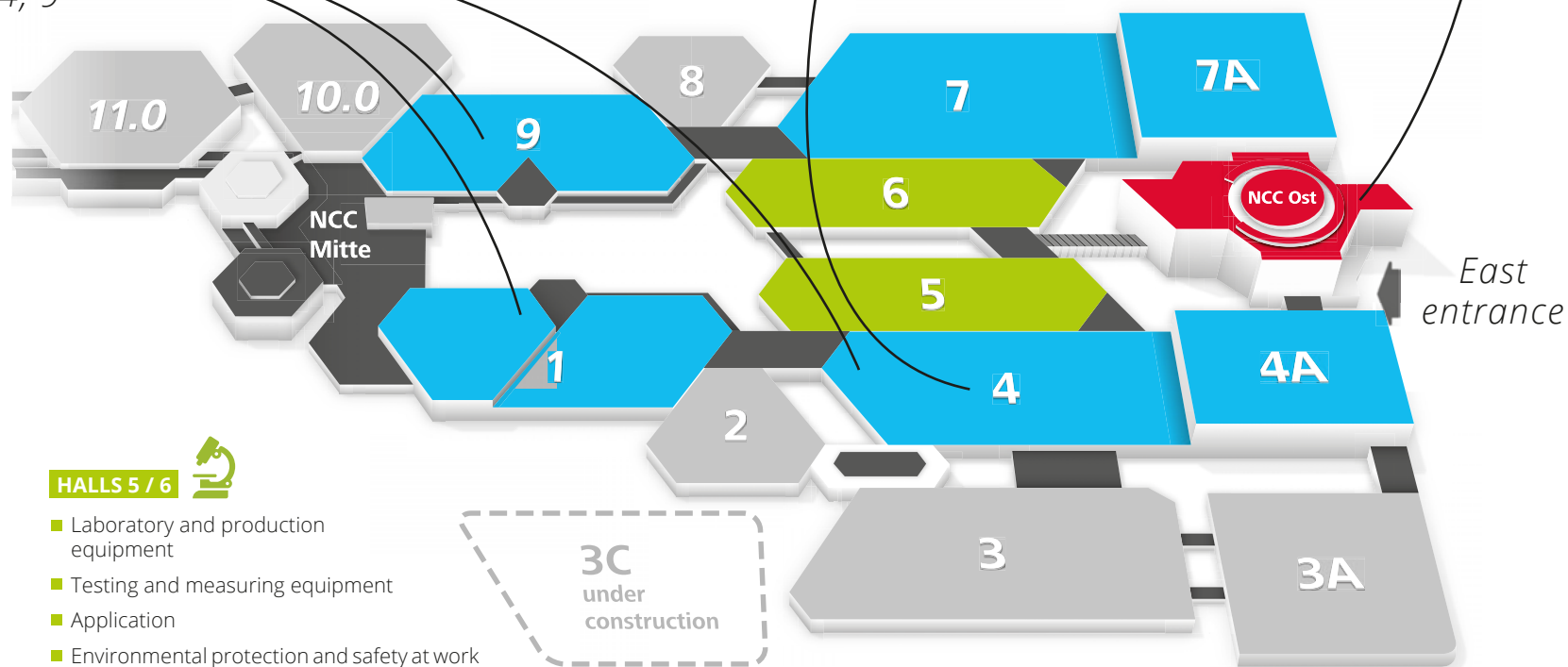
WHAT IS WHERE?

Finding one's way around the European Coatings Show and Conference

Get a sneak peek at innovations in the Product Presentations in halls 1, 4, 9

Check out EC 360°, a new coatings research database in hall 4, stand 4-360

Visit Europe's leading coatings conference



European Coatings Show Conference

HALLS 1 / 4 / 4A / 7 / 7A / 9

- Coating raw materials
- Printing ink raw materials
- Adhesive raw materials
- Intermediates for construction chemicals
- Services

HALLS 5 / 6

- Laboratory and production equipment
- Testing and measuring equipment
- Application
- Environmental protection and safety at work

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TRAVEL AND HOTEL BOOKINGS

LET'S GO TO NUREMBERG

Getting to the ECS and finding a place to stay

There are a number of options for getting to Nuremberg, the venue for the European Coatings Show. This historic city, located in southern Germany, is readily accessible by all modes of transport.

No matter whether you are travelling there by plane, train or car, Nuremberg is easy to reach. And when you get there, you will find an efficient public transport network which will quickly get you from A to B, and especially from the city centre to the Exhibition and Congress Centre.

BY PLANE

Nuremberg's Albrecht Dürer airport has extensive flight connections to other European cities. If you are coming on an intercontinental flight, most neighbouring international airports such as Amsterdam, Frankfurt, London, Munich, Paris and Zurich offer connecting flights to Nuremberg. The airport is located to the north of Nuremberg and has good connections to the city centre. After arrival at the airport, you can get

to the Exhibition Centre in about 25 minutes by underground railway: simply take the U2 in the direction of Hauptbahnhof (main station) and change there to the U1 in the direction of Langwasser Süd.

A taxi to the Exhibition Centre will take about 20 minutes or you might like to rent a car from one of the many car hire companies. If you have any questions about visas, the international representatives of NürnbergMesse (Nuremberg Exhibition company) in your country will be glad to help you. And if you need a letter of invitation for your visa, there is an application form on the ECS website which you can fill out.

BY TRAIN

Another convenient way to travel to Nuremberg is by rail. The Hauptbahnhof (main station) has good connections to other national and international rail networks and is regularly served by express trains, such as ICE, IC and EC. From the Hauptbahnhof, you can reach the Exhibition Centre in eight minutes by taking the U1 in the direction of Langwasser-Süd. All connections to the Exhibition Centre and other local connections can be readily found online at www.vgn.de/en.

Since Deutsche Bahn is a partner of NürnbergMesse, look out for special offers for exhibition visitors. Tickets can also be booked via the ECS website.

BY CAR

A third way to get to Nuremberg is by car. This allows you to enjoy the famous German autobahns (motorways) without being constrained by timetables. Nuremberg has excellent connections to the European motorway network and is easily reached via a number of autobahns: the A3, A6, A9 and A73 all lead to the Exhibition and Congress Centre. If you are using satnav, enter „Karl-Schöneleben-Straße“ or „Messe“ as your destination. Driving on the A6, you can also take exit 59 „Langwasser“ or, if you are on the A9, take exit 52 „Fischbach“.

ACCOMMODATION

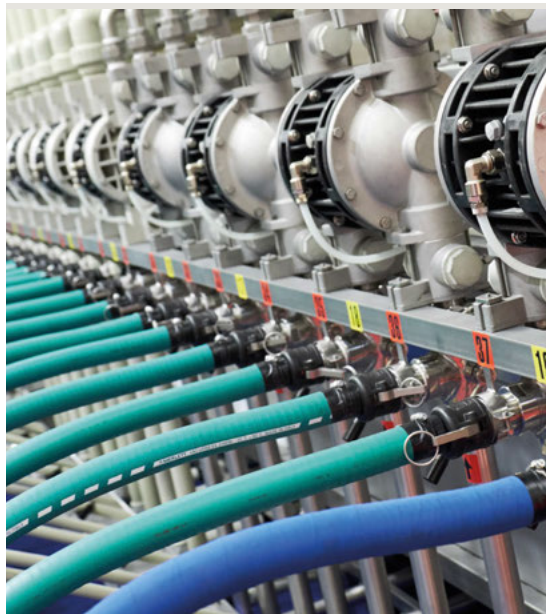
Nuremberg has plenty of accommodation available. Whether you prefer a hotel, private accommodation or alternatives such as camping sites, you can book at your convenience on the following websites: www.european-coatings-show.com/en/exhibition-info/staying-in-nuremberg/hotels and <https://tourismus.nuernberg.de/en/>.

PICTURE GALLERY

LOOKING BACK AT ECS 2017



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Source Gallery: Heiko Stahl



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PRINTING INKS

"MORE ATTENTION TO EHS CONCERNS"

Regulations in East Asia strongly affect the ink market



Eric Zhang,
Eastman Coatings Solutions

"The regulatory landscape in Asia makes this region the most dynamic place in the world," says Eric Zhang, Market Development Manager for Eastman Coatings Solutions, in our interview.

Which technical trends do you see in the area of printing inks? In publishing, vegetable oil is replacing mineral oil in lithographic and newsprint inks. We expect to see more non-VOC inks for lithography.

For packaging applications, Asian companies that use solvent-borne inks seem to be moving away from aromatic and ketone solvents, replacing them with esters and alcohols. Chinese and Korean regulators have excluded aromatic and ketone solvents from packaging ink. It appears that the Indian market will do the same. It's worth noting that solvent-borne ink is becoming universal for substrates and packaging. Conventional solvent-borne ink is transitioning to lower-VOC inks, such as alcohol/water, water-borne, and UV/EB. UV/EB ink is growing fast, but its expansion may be limited by standards restricting the migration of substances in contact with food, the drive for universal application, and a need to lower costs.

In how far do current regulations affect the development of raw materials for printing inks? The regulatory landscape in Asia makes this region the most dynamic place in the world. Regulations in East Asia strongly impact the ink market because policymakers and consumers are paying more attention to EHS concerns. Some controls, such as the JPIMA Negative List and the Chinese GB9685 Standard, are




Source: Goss Vitajil - stock.adobe.com

as popular as REACH and FDA regulations. These efforts have improved packaging quality in the region. Aromatic- and ketone-soluble ink has been totally replaced by ester- and alcohol-soluble ink and raw materials. To improve air quality, the Chinese government is drafting rules to lower VOC emissions from the printing industry. The Korean government has regulations restricting the use of ester

solvents in inks. These actions will impact developments in raw materials for printing ink. In North America, Proposition 65 and EPA rules inhibit the use of many materials, which in turn restrict the use of raw materials that are compatible with the listed materials.

How important have bio-based raw materials become for printing ink additives? For printing ink additives, some bio-based materials have already been used, such as soybean oil for offset ink. Some bio-based raw materials, e.g. cellulose ester, can serve as the main binder or additive in ink. Some bio-based polyols are reportedly being used structural units for polymers. Moreover, in some deve-

loped countries, such as Japan, eco-friendly marks designed by various industrial groups are encouraging ink companies to use more bio-based raw materials during formulation development. However, for now, the main ink components are not bio-based, e.g. organic pigments, polyurethane, and it will take considerable effort over the long haul to increase the bio-based material content of printing ink. 

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MARINE COATINGS

“PAINT PRODUCERS CAN REDUCE CUPROUS OXIDE”

Biocide reduction is one of the most important trends in marine coatings - but not the only one

Modern marine coatings are much more sustainable than they were a decade or two ago. However, there is still plenty of room for improvement. We spoke with Sascha Herrwerth from Evonik about biocide-free solutions, VOC reduction and other trends in modern marine coatings.

Do you see developments that could decrease or even eliminate the use of biocides in marine coatings? There is a strong technology push towards biocide-free foul release coatings in the market; however, the mar-

ket pull is low. The ambitious requirements – such as five-year efficacy and high abrasion resistance – imposed on coatings for trade ships are difficult to meet with non-biocidal systems. Therefore, cuprous-oxide-based anti-fouling paints still make up most of the market, with slow cannibalisation by biocide-free systems. While complete elimination of biocides in marine coatings will only ever occur through regulatory pressure, steps are being taken to decrease their use. As an interim solution, paint producers can either reduce the amount of cuprous oxide used or employ

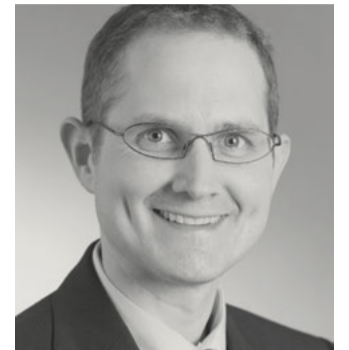
biocides of greater selectivity in lower doses. These biocide-reduced systems provide the right effectiveness and the sought-after coating properties.

Water-borne coatings are still a very small niche in marine coatings. What are the hurdles to reducing the use of solvents in marine coatings in your view? Marine coatings are mainly applied on site – outdoors and with no control over temperature or humidity. The application window for solvent-borne coatings is much wider and allows application even un-

der severe conditions. There are multiple ways to reduce VOCs in coatings, e.g. formulating high solids/ultra-high solids or even 100% solids coatings. They definitely represent an alternative to water-borne technology. Technology shifts are usually only observed when regulatory/legislative changes are enforced. And enforcement can vary country to country.

Which other trends do you see in the marine coatings sector? As always, customers are looking for fast-curing paint systems that can cure in environ-

ments with low temperatures or high moisture content. Complexity reduction is another topic. Usually, 1K systems are preferred to 2K options. Although customers typically request coatings with longer life cycles, reducing the amount of layers from three to two layers is a trend that obviously poses a challenge to the coating's performance. Further typical topics in this market are lower film thickness and higher solids content. Additional coating functionalities – such as easy-to-clean and anti-icing properties – are also of great interest to marine coatings manufacturers. **3**



Sascha Herrwerth, Evonik

DECORATIVE COATINGS

“INDOOR AIR QUALITY IS A GROWING CONCERN”

Research and development in binders for decorative coatings



Chantal Roidot, Arkema

Chantal Roidot, Global Marketing & Business Development Manager at Arkema, explains the latest trends in decorative coatings and expands on the issue of indoor air quality.

Where is the focus of R&D in binders for decorative coatings at the moment? At the moment, R&D is focused on three areas for offering new solutions for decorative coatings.

One is safe use and environmental awareness, e.g. of biocides, eco-labelling and non-toxic raw materials, indoor air quality and renewable raw materials. The second is reduced cost and easy-to-use products, such as multi-purpose binders and coatings for a large variety of substrates, large technology options, TiO₂ reduction and good hiding power. The final focus is on protection and decoration – durability and aesthetics.

Have you noticed a trend towards bio-based options in the decorative sector? Yes, indeed. There is a trend in favour of more sustainable materials, and greater use of more renewable raw materials is one option here. Obviously, bio-based coatings need to offer the right performance and be “environmentally friendly” (low emissions for indoor applications, use with non-toxic raw materials...) to be sustainable on the market. As an example, we have developed

a unique 97% bio-based low-emissions binder for interior wall paints.

How much is indoor air a factor in this area? Next to reductions in VOC levels through regulation and eco-labelling, indoor air quality is a growing concern because there is an issue surrounding the potential presence of formaldehyde and other CMR substances in houses and offices. The construction market is already addressing this concern

through existing norms and local regulations that require data on emissions and low emissions. The decorative market is heading in the same direction and Arkema already has various solutions for meeting these changing requirements. **3**

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FUNCTIONAL COATINGS

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Latest developments in anti-soiling and anti-ice coatings

David Hannan,
Opus Materials Technologies

David Hannan, CEO at Opus Materials Technologies, on latest developments in anti-soiling and anti-ice coatings and the usage of nano-particles in functional coatings.

What are the latest trends in fire safety coatings? Developments in anti-soiling coatings are being driven by the sustainability agenda and the need for clean power. Current so-called 'self-cleaning'

coatings suffer from numerous drawbacks, including a short lifetime (2-3 years), poor transparency and high cost (over €260/litre). This means that they are not usually cost-effective and are not deployed, with losses being accepted as having the lesser economic impact on plant operation. The accumulation of dust on the surface of photovoltaic modules decreases the amount of solar radiation reaching the cell and leads to power loss. This can reduce power output from a PV system by 15-30%, even in moderate dust conditions. Data gathered from 186 solar farms in California has revealed a 7.4% loss in power generation over an average 145-day summer. Currently, manual cleaning is the most widespread technique and is a competitive solution to anti-soiling coatings. It requires manual access and so is inappropriate or too hazardous for building applications (i.e. BIPV) and is expensive. In fact, many industrial users that have carried out a cost-benefit analysis conclude that in

most situations it is not worthwhile to do any cleaning at all and to take the loss in impaired efficiency. In effect, this is reducing the efficiency of the globally installed generating capacity by around 10%. Cleaning also uses large amounts of water which precludes its use in areas of water scarcity such as the Middle East and hinders efforts in the EU to improve water-use efficiency. A key development in this area is the prevention of soiling build-up in the PV sector. Recently, a number of nano-technology products have come to market, but a major limitation of all of these coatings is their limited durability and high cost.

What is the current state of the art in anti-icing coatings? Creating anti-icing coatings that have long lasting ice repellent properties has been an area of research for many institutes across the globe for some time, and yet to date there has been very little in the way of true breakthroughs in this area – until now. One of the major focus areas

for anti-icing coatings is the aviation industry. In Northern latitudes, icing of aircraft continues to compromise flight safety. It is at best a major cause of delays, at worst the cause of accidents. Ice-related incidents during the last 20 years have led to the loss of more than 250 lives. In addition, ice is a major problem on the ground. De-icing during freezing conditions is mandatory for take-off, expensive and consumes up to 1000 litres of fluid. With strong consumer demand for low-cost air travel operators need to reduce costs through savings on ice protection and improved efficiency. These problems could all be avoided by preventing ice from sticking to the aircraft in the first place by means of an ice-repellent coating.

Please expand on your approach to incorporate nano-particles to improve the functionality of coatings? Repellency and durability are usually incompatible within a single material.



One of the major focus areas for anti-icing coatings is the aviation industry.

Repellent surfaces are difficult to bond to substrates, making them prone to rapid erosion from weathering (particularly sand) or erosion under flight conditions. The breakthrough achieved with "SolarSharC" is the co-location of water-repellent functional groups alongside active functional groups on nano-structured particles. These then bond to the resin matrix, cementing the silica nano-particles into the resin to yield a tough, durable and transpa-

rent coating. The nano-particles are smaller than the wavelength of visible light and so do not scatter light, providing a high degree of transparency. Hence, the multi-functionalised silica nano-particles provide a unique combination of repellency and durability needed for long effective lifetime of low/zero maintenance solar PV. In addition, the nano-particle structure provides high transparency, which boosts generating efficiency. ☑

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BIO-BASED RAW MATERIALS

“MONOMERS WITH NOVEL STRUCTURAL ELEMENTS”

Nature offers many promising raw materials for the coatings industry



Tobias Robert,
Fraunhofer WKI

If the coatings industry really wants to become more sustainable, it must reduce its dependence on oil. But that is easier said than done. And not all renewable raw materials are automatically environmentally friendly. We spoke to Tobias Robert from the Fraunhofer Institute for Wood Research (WKI) in Braunschweig, Germany.

Which bio-based raw materials do you believe are currently important for the paints and coatings industry? The industry has traditionally used a large number of bio-based raw materials. These include cellulose, starch and vegetable oils. But the goal, of course, is to extend the variety of the bio-based raw materials in use. This is why many new (partially) bio-based raw materials, such as polyols and isocyanates, have recently been launched onto the market. These are mainly fatty acids serving as starting materials, as well as new monomers that can now be produced biotechnologically from renewable raw materials.

Among these monomers are 1,3-propanediol, sebacic acid, itaconic acid and succinic acid which serve as building blocks for polyesters, alkyds and polyurethanes. However, there are also binders, such as polyacrylates, for which hardly any bio-based production solutions exist.

And which raw materials will become important in the future? There are synthetic building blocks such as furan dicarboxylic acid and isosorbide, which I believe are on the cusp of application. Admittedly, though, there are still a few problems to overcome before these can be used in standard applications.

What sort of problems? Studies are currently being conducted into the potential of furan dicarboxylic acid for use especially in the plastics sector. It's conceivable that polyethylene furanoate (PEF) could prove to be a bio-based alternative for PET bottles. However, availability is still very limited. At the moment, furan dicarboxylic acid can only be obtained at very high prices from suppliers of fine chemicals. There is not enough production capacity at the moment.

Do you think bio-based raw materials are more likely to be deployed as direct one-for-one replacements for fossil raw materials or will the focus be placed more on their oft-vaunted new properties? That depends very much on the raw materials. For example, drop-in applications exist in which the petrochemical feedstock is produced in a bio-

based manner, i.e. from renewable raw materials. The advantage of this approach is that the industry doesn't have to modify its processes or products, provided that the bio-based raw materials are of good enough quality. Bio-based acrylic acid would be an example of this, even though production costs are still higher than for petrochemically produced acrylic acid. It will therefore probably take several years for the bio-based version to become commercially competitive. However, there are also many new monomers which offer the benefit of having novel structural elements that can also be used to produce new products or properties. I think there is great potential here for bio-based raw materials. This potential is also driving our research and development work here at the Fraunhofer WKI.

Can you give an example of such new properties? Well, if you incorporate itaconic acid into polyester, the double bonds are distributed along the polymer backbone. In conventional polyester acrylics for UV-curing applications, on the other hand, the reactive bond is only found at the end of the chain. Although the level of reactivity is different, it is possible to obtain coatings that possess totally different mechanical and physical properties. For example, greater hardness or improved weathering. ☑



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