欧洲涂料学院（中国）
EUROPEAN COATINGS ACADEMY CHINA

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生物基涂料和水性涂料

BIO-BASED & WATER-BASED COATINGS

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水性涂料和生物基涂料首次联合研修会

- 涂料行业两大热门话题，首次联合同台呈现，内容丰富，不容错过！
- 16位欧洲权威专家，16场前沿技术精彩报告。不仅涵盖水性和生物基领域的研发最新进展，还包括一些实际解决方案分享。
- 国内知名权威专家精准解读，线上同步答疑解惑；议程满满，为您提供与国际同行思想碰撞和交流的机会。

主旨演讲

KEY NOTE

涂料的新型可持续发展组分

New sustainable components for paints and coatings

Alexander Wentzel博士，挪威科技工业研究所，挪威
Dr. Alexander Wentzel,Sintef Industry, Norway

用于水性涂料的生物基聚合物：深入解读在各种应用领域中的技术现状

Bio-based polymers for water-based paints and coatings: An insight into the current state of the art for various applications

Gregor Apitz博士，Alberdingk Boley公司，德国
Dr. Gregor Apitz, Alberdingk Boley, Germany

Topic 1 专题一 生物基涂料
Bio-based Coatings

乙酰丙酸酯和乙酰丙酸酯缩酮：新一代可持续发展的成膜助剂
Levulinates and levulinate ketals: A new generation of sustainable coalescing agents

Jonathan Lane，NXTLEVVEL Biochem公司，英国
Jonathan Lane,NXTLEVVEL Biochem, UK

超越生物基：用甲基丙烯酸酯为可持续发展领域提供新的机遇
Beyond bio-based: Creating possibilities for a sustainable world with methacrylates

Sabine Kömmelt博士，Evonik Operations公司，德国
Dr. Sabine Kömmelt,Evonik Operations, Germany

演讲嘉宾 Sabine Kömmelt博士在Evonik公司特种甲基丙烯酸酯产品线应用技术部门担任实验室经理。她在（甲基）丙烯酸单体、其聚合行为及其在各种应用中的性能领域拥有超过10年的经验。Sabine Kömmelt博士在2010年加入Evonik公司之前，获得了美因茨大学的高分子化学博士学位。

Speaker Dr. Sabine Kömmelt works as lab manger in the Applied Technology for the Product Line Specialty methacrylates of Evonik. She has over 10 years of experience in the field of (meth)acrylic monomers, their polymerization behavior and their performance in various applications. Dr. Sabine Kömmelt received her Ph.D. in Polymer Chemistry from the University of Mainz prior joining Evonik in 2010.

淀粉酯作为涂料的成膜物：挑战与潜力
Starch esters as film former in coatings: Challenges and potentials

Christina Gabriel-Liebs，弗劳恩霍夫应用聚合物研究所，德国
Christina Gabriel-Liebs,Frauenhofer IAP, Germany

用于涂料的生物基聚酯和丙烯酸树脂：挑战与解决方案

Bio-based polyester and acrylic resins for coatings: Challenges and solutions

Martin Ocepek博士，Helios Resins公司，斯洛文尼亚
Dr. Martin Ocepek,Helios Resins, Slovenija

演讲嘉宾 Martin Ocepek博士目前是Kansai Helios集团的合成树脂研发主管。2011年从斯洛文尼亚卢布尔雅那大学获得硕士学位,2015年获得卢布尔雅那大学高分子化学博士学位。经过几年的开发并在市场上推出了多种创新获奖树脂，他于2019年被任命为合成树脂研发主管。如今，对用于涂料和复合材料的丙烯酸酯基和聚酯基树脂、工艺技术开发和技术营销进行研究。是循环经济战略国家伙伴关系技术委员会成员，也是COST行动FUR4Sustain “欧洲呋喃基化学品和材料促进可持续发展网络”管理委员会成员。

Speaker Dr. Martin Ocepek is currently a Head of R&D Synthetic Resins in Kansai Helios Group. After obtaining his MSc in 2011 from the University of Ljubljana (SI), he obtained Ph.D. in Polymer Chemistry from the University of Ljubljana in 2015. After a few years of development and launching several innovative and awarded resins on the market, he was appointed as Head of R&D Synthetic Resins in 2019. Today the group conducts research on the acrylate- and polyester-based resins for coatings and composites, process technology development, and technical marketing. He is a member of the technology council of the strategic national partnership for the circular economy, and a member of the management committee of COST action FUR4Sustain "European network of FURan based chemicals and materials for a Sustainable development".

摘 要 近年来，普遍的可持续发展意识、立法以及随之而来的客户要求决定着工业发展的趋势，相对保守的涂料领域也不例外。

醇酸树脂作为本征生物基衍生聚合物的代表，仍然大量存在于许多涂料领域，但它们有着一些固有的缺点。在过去几十年里，高性能涂料使用石油基原材料生产，在保持视觉、防护和其他特殊性能的同时，显著改善了基材防护，使耐用性持续更长时间。

长期以来，水性涂料仅限于要求不高的应用，例如DIY涂料。进入新千年后，由于对人类健康和空气污染的影响，（欧洲）立法机构推动工业涂料生产商减少挥发性有机化合物（VOCs）。

最近人们越来越多地研究许多化石基组分的潜在替代品。工作集中在用于聚合物（树脂）合成的新的或改进的生物基单体。最简单的情况是所谓的直接取代方法，其中一种化石基物质被一种相同的来自生物质的物质取代。生物基碳可以通过C14或生物质平衡（BMB）认证进行验证。此外，许多替代生物物质已在各种涂料体系中使用和评估。除了性能，还必须考虑性价比。

增加生物基碳是第一步也是最重要的一步。然而，需要准确的生命周期评估（LCA）才能证实树脂和涂料是可持续发展的。

Abstract In recent years, general sustainability awareness, legislation and consequently also customer requirements are dictating trends in industrial development, and the relatively conservative coating segment is no exception.

Alkyds as representatives of intrinsic-bio-based-derived polymers are still strongly present in many coating segments but they possess some intrinsic drawbacks. In the last decades, high-performance coatings are being produced from petrol-based raw materials, offering significant improvements in substrate protection and its prolonged durability while maintaining visual, protective and other special properties.

For a long time, water-based coatings were limited to less demanding applications, such as do-it-yourself (DIY) paints. After entering the new millennia, (European) legislation pushed industrial coating producers to reduce volatile organic compounds (VOCs) due to impacts on human health and air pollution.

Many potential replacements of fossil-based building blocks are being increasingly investigated lately. Efforts are focused on new or improved bio-based monomers for polymer (resin) synthesis. The simplest case is the so-called drop-in approach where a fossil-based substance is replaced by an identical one derived from biomass. Bio-based carbon can be validated either by 14C or via bio-mass-balance (BMB) certification. Additionally, many alternative bio-substances have been used and evaluated in various coatings systems. Besides performance, cost-performance ratio must also be considered.

Increasing bio-based carbon is the first and most important step. However, accurate Life Cycle Assessment (LCA) is needed to claim sustainable resins and coatings.

超越水性：涂料用生物基溶剂的选择

Beyond aqueous: Bio-based solvent options for paints and coatings

Anna Zhenova，Green Rose Chemistry公司，英国

Anna Zhenova,Green Rose Chemistry, UK

演讲嘉宾 Anna Zhenova是Green Rose Chemistry公司的创始人兼首席执行官。协助涂料、香精香料、个人护理领域的绿色产品开发，在溶剂、聚合物和材料方面的经验帮助客户开发、采用和销售真正的绿色产品，与研究中心、非营利组织和行业协会合作，加速可持续发展化学和生物经济领域的创新。Green Rose Chemistry是一家使用尖端可持续发展化学品解决大规模工业问题的咨询公司。

Speaker Founder and CEO of Green Rose Chemistry, I use my experience with solvents, polymers, and materials to help clients develop, adopt, and market truly green products. Assisted with green product development in paints & coatings, flavour & fragrance, personal care. Working with research centres, non-profits, and trade associations to accelerate innovation in sustainable chemistry and bioeconomy. Green Rose Chemistry is a consultancy that solves large-scale industrial problems using cutting-edge sustainable chemistry.

如何设计可持续发展助剂

Sustainable additives by design

Tina Radespiel博士，Byk公司，德国

Dr. Tina Radespiel,Byk, Germany

Topic 2 专题二 水性涂料

Water-based Coatings

水性涂料的下一代创新路线

Next level innovation routes for waterborne coatings

Andre van Linden，AkzoNobel公司，荷兰

Andre van Linden,AkzoNobel, Netherlands

演讲嘉宾 Andre van Linden在涂料行业从业36年。负责北欧和东欧研发和市场工作。 在Sassenheim工作十年，负责几个研发团队。目前与ARC CBBC (NL), CB2 (USA) 和SuStiCoat (UK)合作。此外，作者还在几个战略委员会中任职，负责NVVT（荷兰涂料技术协会），积极参与荷兰Fatipec和ISO TC/35涂料标准制定。

Speaker Andre van Linden is more than 36 years active in the paint industry. After a career in Research and Marketing he was BU R&D Director in North and East Europe. Already for 10 years he is working from Sassenheim, responsible for several research groups. He is now active in collaborations like ARC CBBC (NL), CB2 (USA) and SuStiCoat (UK). He is active in several strategy boards and chairing the NVVT (Dutch paint technologist association); Dutch Fatipec and the ISO TC/35 for Paints and Coatings standards.

摘 要 过去几年提到的许多减少碳足迹和改善健康、安全与环境状况的优先事项可能会导致采用水性涂料，但需要在水性涂料的开发中迈出下一步，以确保我们可以更广泛地使用它们并满足更严格的规范。我们公司的理念也是“人类、地球、涂料”，将水性涂料作为未来的重要路线之一。为了实现我们的目标，我们需要转变处理能源、原料和材料的方式。在我们参与的研究联盟中，我们研究了几种新方法，以更有效的方式制造涂料，并增加新的功能，从而生产出客户需要的产品。除了行业已经完成的所有工作外，新的见解和技术有助于以多种方式减少、再利用/回收和再生原材料和产品。我们循序渐进，只有当整个链条上的学术界、初创企业、供应商、直到客户和废物处理商共同努力，才能找到解决方案，朝着使用和制造可持续发展涂料的新方式迈出重要的几步。

Abstract Many of the priorities mentioned in the last years towards a lower carbon footprint and better HSE profiles can lead to waterborne coatings. But it is needed to make next steps in the development of waterborne coatings to ensure we can use them wider and for tougher specifications. Also our company's purpose People.Planet.Paint. leads to waterborne coatings as one of the important routes for the future. For reaching our targets we need transitions in how we deal with energy, feedstock and materials. In the research consortia where we are active several new methods are investigated to create coatings in a more efficient way and with new added functionalities that can lead to products, that have everything a customer wants. Next to everything that is already done in the industry the new insights and technologies help for reducing, reusing / recycling and renewing the raw materials and products in several ways. Step by step and only when the whole chain from academics; start-ups; suppliers until customers and waste handlers work together solutions can be found that make significant steps towards the new way of using and creating sustainable coatings.

用于水性金属保护涂料的基料

Binder for waterbased coatings for metal protection

Chintankumar Patel，BASF公司，德国
Chintankumar Patel,BASF, Germany

提高水性门窗涂料施工性能的技术路线

The road to better application properties for water-borne trim paints

Wouter Kloosterman，Allnex公司，荷兰
Wouter Kloosterman,Allnex, Netherlands

演讲嘉宾 Wouter Kloosterman,高分子化学PhD学位，涂料行业从业十年。2012-2016年，在纽佩斯树脂（Nuplex Resins BV）曾任创新研究高级研究员、亚洲团队高级研究员，先后主要负责新产品新技术研发、亚洲地区项目中水性涂料中聚氨酯和聚丙烯酸酯分散体开发；2016年至今，任湛新allnex高级研究员，研发部门技术项目主管，主要从事聚丙烯酸酯分散体中长期应用，包括建筑涂料、工业木器涂料和汽车涂料市场细分领域。

Speaker Wouter Kloosterman with a Ph.D. in polymer chemistry has worked in the coatings industry for ten years. 2012-2016, Senior Chemist Innovative Research, Senior Chemist Asia Team, Nuplex Resins BV. Technical project lead in development of new trends in world of coatings to be applied on long term. Technical project leader in a region-specific project team for development of polyurethane and polyacrylate dispersions for waterborne basecoats. 2016 to date, Senior Chemist Research, allnex BV. Technical project leader in Research section of R&D department, dealing with complex topics for mid-long term application in polyacrylate dispersions for Decorative, Industrial Wood and Automotive markets.

摘　要 在过去的几十年里，欧盟关于挥发性有机化合物排放的立法一直在推动从溶剂型涂料向水性装饰涂料的转变，但水性内外装饰涂料的施工性能仍逊于溶剂型涂料。特别是开放时间和湿边时间需要改进。这里开放时间的定义是最长干燥时间，在此期间仍然可以对涂料进行小的修正而不留下清晰可见的刷痕。正如之前报道的那样，一旦干燥过程中的所谓薄膜流动值低于某个临界限值，水性涂料的开放时间就会结束。这些物理学方面的新见解导致了新基料概念的发展，它们可显著改善开放时间。该报告将讨论allnex公司改善开放时间的第三代基料，并将比较施工特性。

Abstract Legislation on the emission of volatile organic compounds in the European Union has been driving the switch from solvent borne to waterborne trim paints in the last decades. However, the application properties of waterborne interior and exterior trim paints is still inferior to that of solvent-borne paints. Especially the open time and wet edge time needs to be improved. The open time as defined here is the maximum period of drying during which small corrections to the paint can still be made without leaving clearly visible brush marks. As reported previously the open time of a water-borne paint ends as soon as the value of the so-called film flow left falls below a certain critical limit during the drying process. These new insights in the physics have led to the development of new binder concepts that offer significantly improved open time. The three generation of binders with improved open time by allnex will be discussed and application properties will be compared.

带有机官能团的硅烷：实现高性能水性涂料的技术

Organofunctional silanes: High performance water-based coatings technology enablers

Dmitry Chernyshov博士，Momentive公司，德国
Dr. Dmitry Chernyshov,Momentive, Germany

演讲嘉宾 Dmitry Chernyshov 在俄罗斯科学院A.N.Nesmeyanov元素有机化合物研究所获得PhD学位，从事有机聚合物和复合材料研究。2003年，开始在杜邦汽车漆和修补漆担任配方研究员。2011年，加入迈图高新材料（Momentive Performance Materials）在硅烷事业部做应用研究。目前，他负责研发核心部门硅氧烷和硅烷技术支持和新应用开发。此外，他还发表多篇学术论文，并持有多项专利应用。

Speaker Dmitry Chernyshov holds PhD in polymer chemistry from A. N. Nesmeyanov Institute of Organoelement Compounds of Russian Academy of Sciences where he worked on synthesis and application of inorganic polymers and composites. In 2003 he started his professional career within the coating division of DuPont as a formulation chemist for automotive and refinish paints. In 2011 he joined Momentive Performance Materials as an application development specialist for the business unit silanes. In his current role he is responsible for technical support and development of new applications for silicones and silanes in CAS industries. Dmitry Chernyshov is an author of several academic papers and patent application inventions.

摘 要 VOC和HAPS排放法规的收紧以及新采用的碳足迹减少举措继续促进全球水性涂料市场的快速增长。如今，最先进的涂料体系可以满足大多数客户对建筑、地坪和工程涂料市场的要求。然而，在进行要求苛刻的金属表面涂装时，当前的水性技术仍难以满足典型的行业严苛的性能要求。报告中，我们将展示有机硅化学如何帮助解决可持续发展挑战，同时有利于填补水性涂料技术的现有性能短板。特别是，我们将介绍新一代有机官能硅烷和硅氧烷，并讨论它们对水性环氧、丙烯酸和聚氨酯涂料的机械性能、附着力和耐腐蚀性的影响。设计具有更高生产率，更长使用寿命和成本效益的水性涂料体系的科学家和涂料配方设计师可能会对研究的实验结果感兴趣。

Abstract Tightening of VOC and HAPS emission regulations as well as newly adopted carbon footprint reduction initiatives continue to contribute to the rapid growth of global water-based coating markets. Today, state-of-art coating systems fulfil most customers' specifications for the architecture, flooring and construction markets. However, when the need is for demanding metal coating applications, the current water based technologies still struggle to comply with typical industry stringent performance requirements. In the current publication, we will demonstrate how organosilicons chemistry can help solve sustainability challenges while being beneficial bridging existing performance gaps of water-based coating technologies. In particular, we will introduce new generation organofunctional silanes and siloxanes and discuss their effects on mechanical properties, adhesion and corrosion resistance of water based epoxy, acrylic and polyurethane coatings. Experimental results of the study will be interesting for scientists and coating formulators aiming to design cost-effective, water-based coating systems with improved productivity and service life.

使用新型水性环氧树脂组分智能定制符合VOC排放标准的涂料

Smart tailoring of VOC compliant coatings with novel waterborne epoxy building blocks

Dominique Vandenberghe，Westlake Epoxy公司，比利时
Dominique Vandenberghe,Westlake Epoxy, Belgium

摘 要 水性环氧体系在涂装应用性能诸多方面与溶剂型产品相媲美，甚至优于溶剂型产品。水性环氧体系现在用于集装箱、运输、ACE设备防护涂料和地坪涂料配方。这些终端应用领域使用水性涂料的主要驱动来源于降低涂料中VOC含量，同时也能保持高性能涂料需求。这也使得新兴环氧树脂和氨基固化剂得到进一步发展。本报告将阐述如何设计环氧结构单元，能与水性涂料特殊应用领域要求有效结合，从而满足防腐性能和机械性能的最高标准，同时保持配方简化易操作。

Abstract Waterborne epoxy systems have shown the ability to perform as well as, or even better than their solvent-borne counterparts in a variety of coating applications. Waterborne epoxy systems are now being formulated into coatings for shipping containers, transportation or agricultural & construction equipment, protective coatings, as well as floor coatings. The main driver for waterborne coatings in those end-uses is the need to reduce VOC's in the paints (VOC = Volatile Organic Compound) while maintaining final paint performance at high level. This has led to development of new epoxy resins and amine curing agents. This presentation will demonstrate how these specially designed epoxy building blocks can be effectively combined to tailor waterborne coatings to specific application requirements and meet the highest standards for corrosion and mechanical protection, while maintaining ease of formulation.

用于高性能建筑涂料和防护涂料的高支化度乙烯基酯乳液

Highly branched vinyl ester-based emulsions for high performance architectural paints and protective coatings

Ludivine Augry，Hexion Research Belgium公司，比利时
Ludivine Augry,Hexion Research Belgium,Belgium

摘 要 水性装饰和防护涂料的主要要求之一是高耐水和耐湿性。VeoVa™乙烯基酯是生产用于各种环境友好水性涂料的疏水性胶乳的理想共聚单体。这些乙烯基酯单体是真正的多功能单体，因为它们可以很容易地通过自由基聚合与乙酸乙烯酯和丙烯酸单体发生反应。作为新癸酸、新壬酸和2-乙基己酸的乙烯基酯，这些不同的单体涵盖了从-36 °C到+70 °C的T_g范围。其高度支化的疏水结构的加入在许多方面强化了乳胶和最终应用性能，特别是在稳定性、耐久性、附着力以及防水和耐碱性方面。这使它们成为生产用于高户外耐性涂料的乳液聚合物的理想共聚单体。用支化乙烯基酯改性的丙烯酸聚合物表现出更高的耐碱性、非常好的和持久的防水性以及改进的干湿附着性。需要这些特性的典型应用实例包括木材着色剂、外墙仿石涂料、防腐涂料和弹性屋顶涂料。

Abstract One of the main requirements of waterborne decorative and protective coatings is a high resistance to water and humidity. VeoVa™ vinyl esters are ideal co-monomers for the production of hydrophobic latices for a wide range of environmentally friendly water-based coatings. Those vinyl esters monomers are truly versatile monomers as they can easily react via radical polymerization with both vinyl acetate and acrylic monomers. As vinyl esters of neodecanoic, neononanoic and 2-ethylhexanoic acids, these different monomers cover a wide Tg range from -36 °C to +70 °C. The incorporation of their highly branched hydrophobic structure enhances the latex and final application properties in many respects, in particular regarding stability, durability, adhesion, as well as water and alkaline resistance. This makes them ideal co-monomers for the production of emulsion polymers for use in paints with a very good outdoor durability. Acrylic polymers modified with branched vinyl esters show an increased alkali resistance, very good and long-lasting water repellence as well as an improved dry and wet adhesion. Typical examples of applications where these properties are desirable are wood stains, exterior masonry coatings, anti-corrosion coatings and elastomeric roof coatings.

使用可再生原料分散体和混合物面临的挑战

Challenges in the use of dispersions and mixtures on basis of renewable raw materials

Rolf Simon，Synthopol公司，德国
Rolf Simon,Synthopol, Germany

演讲嘉宾 Rolf Simon在斯图加特学习化学（涂料和塑料），1981年在美凯维奇（Mankiewicz Gebr. & Co. ）汉堡工作，主要负责双组分涂料研发工作。1995年，在Synthopol Chemistry位于 Buxtehude应用实验室工作。他负责水性涂料体系开发，特别是一级和二级丙烯酸酯和聚氨酯分散体研发。

Speaker After studying chemistry (paint, varnish and plastics) in Stuttgart, Rolf Simon worked in the research and development department of Mankiewicz Gebr. & Co in Hamburg from 1981 and was responsible for the development of 2-component paints. In 1995 he moved to Synthopol Chemistry in Buxtehude to work in the application technology lab. Rolf Simon is responsible for the development of water-based coating systems, in particular based on primary and secondary acrylate and polyurethane dispersions.

使用无钴高性能催化剂提高水性醇酸涂料的耐候性

Enhanced Durability of Waterborne Alkyd Coatings Utilizing Cobalt-Free High-Performance Catalysts

Joshua Halstead博士，全球应用开发经理，美利肯公司
Dr. Joshua Halstead, Global Application Development Manager, Milliken

演讲嘉宾 Joshua Halstead是博谢思全球应用开发经理，他的团队负责研究博谢思的产品性能及其机理和化学结构，以创建新的应用领域。Joshua Halstead拥有有机化学博士学位，曾在全球大型涂料公司担任过十多年的技术经理职务，在涂料行业拥有丰富的经验。

Speaker Joshua Halstead is the Global Application Development Manager of Borchers. His team is responsible for studying the properties of Borchers products and their mechanisms and chemical structures and creating new application fields. Joshua Halstead holding a doctoral degree in organic chemistry has worked as technology manager at large global coatings companies for more than ten years. He has rich experience in the coatings industry.

摘 要 主要介绍水性醇酸树脂的高性能催化剂测试结果。这些工作主要着眼于水性醇酸涂料的耐侯性，并将此性能与一些相关的丙烯酸基准进行比较，并研究我们所看到的一些性能的科学原理以及它如何影响这些材料的实际应用。最后，我们将总结所有内容。

Abstract This work will go through the results of the high-performance catalyst testing in these waterborne alkyds. The work we did mainly looks at the durability of waterborne alkyd coatings and compares this performance against some relevant acrylic benchmarks, as well as looks into some of the science of the performance we see and how that affects the practical applications for these materials. And then finally, we will summarize everything at the end.

欧洲涂料学院（中国）
EUROPEAN COATINGS ACADEMY CHINA

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