December 10, 2025

Tuesday, March 3, 2026

09:00 – 09:30

CNSL-Derived Polyols and Diols: Enhancing Polyurethane Adhesive Performance with Renewable Materials

Cardolite Specialty Chemicals Europe; BE-Mariakerke
Tom Berckmans

Abstract:
Cashew Nut Shell Liquid (CNSL) is a non-edible natural oil obtained as a by-product of the Anacardium Occidentale nut.

Its main component (cardanol) is characterized by unique chemical features (presence of aromatic ring, phenoxy groups, alkenyl side chain), that allow its industrial use in a wide range of thermosetting materials, from polyurethane systems to friction polymers.

In polyurethane applications, cardanol can be successfully used as isocyanate blocking agent, viscosity reducer and raw material for the production of hydroxyl functional compounds with different functionalities and physico-chemical properties. Cardanol and its derivatives are suitable for CASE applications (where they can provide improved hydrolytic stability, for instance) as well as foams (both flexible and rigid).

This Paper will present the performances of cardanol-based diols and polyols in polyurethane adhesives, highlighting their benefits (e.g. hydrophobicity, chemical resistance, adhesion to various substrates) when compared to both fossil-based and natural-oil derived benchmarks, as well as their favorable sustainability profiles (LCA).

09:30 – 10:00

Pioneering Biobased Innovations: Furanic Humins and FDCA for Sustainable Adhesives and Binders

Avantium Renewable Polymers; NL-Amsterdam
Dr. Francesco Acquasanta

Abstract:
Avantium is pioneering the development of next-generation biobased chemical products through its YXY® technology, which catalytically converts plant-based sugar (fructose) into FDCA and furanic humins, representing a sustainable potential solution for binders, sealants, and adhesives industry. Derived from renewable resources, these products are characterized by an attractively low carbon footprint and are approaching industrial-scale availability – with Avantium's 5 kta Flagship Plant in Delfzijl (NL) coming on stream - positioning them as promising alternatives to conventional fossil-based materials. FDCA (2,5-furandicarboxylic acid) is a versatile biobased aromatic monomer suitable for an array of plant-based chemicals and plastics such as polyethylene furanoate (PEF), with potential to drive innovation across multiple adhesive and resin applications, thanks to its unique chemical structure and performance characteristics.
Furanic humins - a co-product of Avantium's YXY® technology - also present intriguing opportunities thanks to their intrinsic thermoset nature; example applications in adhesives and binders will be showcased. This abstract invites collaboration from producers of adhesives, resins, and binders, as well as engagement from end-users seeking sustainable material solutions and lower carbon footprint.

10:00 – 10:30

New Adhesive Formulations Based on Novel POM-Polyols from Power-to-X Technologies

Jowat; DE-Detmold and Power2Polymers
Dr. Hartmut Henneken

Abstract:
Coming soon

10:30 – 11:00 REFRESHMENT BREAK

11:00 – 11:30

Ensuring a Stress Crack Free Future in Plastic Bonding Using Atmospheric Pressure Plasma Coatings

SKZ - German Plastics Center; DE-Würzburg
David Herbig

Abstract:
Environmental Stress Cracking (ESC) is one of the most common failure mechanisms in polymer components, often triggered by media exposure under mechanical stress. Recent findings show that additives in adhesives can also induce ESC in polymers (adhesive-induced ESC), while conversely, additives migrating from the polymer into the adhesive can compromise adhesion or plasticize the adhesive layer. These interactions are complex and not yet fully understood, and current mitigation strategies are often inadequate due to environmental, technical, or economic limitations.
The presented work addresses this challenge by investigating additive migration mechanisms and developing a novel barrier approach using environmentally friendly, inline-capable atmospheric pressure plasma coatings. These plasma-polymerized layers are applied to polymer surfaces prior to adhesive application, aiming to block additive migration while maintaining or enhancing adhesion.

Experimental results, using the strip bent method, demonstrate that adhesive-induced ESC in polymethyl methacrylate (PMMA) can significantly reduce mechanical strength (Figure 1). In this example, a 2K polyurethane (PU) adhesive was applied to the PMMA surface. However, plasma-coated PMMA surfaces showed restored strength levels comparable to unexposed reference samples. Microscopic analysis confirmed that the coating effectively prevents interfacial degradation. Furthermore, lap shear tests revealed that the plasma coating not only preserves but can even improve adhesive bond strength, increasing from 5.4 MPa (adhesive failure) to 7.2 MPa (cohesive/adhesive failure).

These findings highlight the dual functionality of plasma coatings as both a migration barrier and adhesion promoter, offering a promising solution to enhance the long-term durability of polymer adhesive bonds.

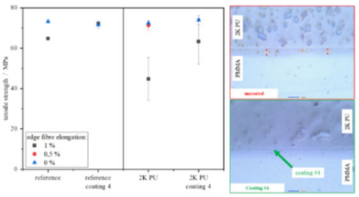

Figure 1:
Left: Tensile strength of PMMA (uncoated, coated) after bent strip tests at different edge fiber elongations (0%, 0.5%, 1%) with a 2K PU. Right: Microscopic images of the interface with and without coating.

11:30 – 12:00

Enhanced Adhesion on Painted Surfaces with Openair-Plasma® Technology

Plasmatreat Schweiz; CH-Diepoldsau
Klaus Kresser

Abstract:
Surface pretreatment is crucial for the permanent adhesion of adhesives to paints or coatings. Conventionally, mechanical processes such as grinding or chemical methods such as the application of primers are used for this purpose. However, these approaches are timeconsuming and material-intensive, can damage the substrate surface or cause environmental and occupational safety problems. Atmospheric pressure plasma (APP) is an efficient alternative that does not require additional chemicals and can be integrated inline into production processes. The generation of reactive species and local UV radiation removes organic contaminants, increases surface energy and introduces functional groups that improve wettability and adhesion. Unlike mechanical processes, APP modifies the surface in a controlled manner without material removal or geometric restrictions and offers reproducible treatment even on complex structures. Compared to primers, there are no additional process steps or storage and disposal costs for chemicals. Overall, atmospheric pressure plasma provides a sustainable, cost-effective and robust method for optimizing adhesion to paints and coatings while helping to reduce environmental impact.

12:00 – 12:30

What a Drop Can Tell: Exploring the Power of Contact Angle Measurement

Innotech Marketing and Konfektion Rot; DE- Mühlhausen
Buruk Sen

Abstract:
Surface quality plays a fundamental role in the success of bonding, coating and painting processes — and thus in the final quality and durability of manufactured products. This presentation introduces contact-angle measurement as an effective, non-destructive method to assess surface readiness along the production chain and to support quality assurance and process reliability.

Contact-angle measurement quantifies how a liquid droplet interacts with a substrate surface, providing a clear indication of surface energy, cleanliness and suitability for adhesion or coating. Compared to traditional, subjective surface-preparation tests (e.g., water-break tests or dyne pens), this method delivers objective, reproducible data that help to detect surface contamination, inadequate cleaning or insufficient surface activation before critical process steps.

Using this approach early and repeatedly in production enables process-integrated surface control. As a result, manufacturers can avoid common defects — like coating failure, poor adhesion, delamination or uneven surfacefinish — thereby reducing scrap, rework and warranty costs. The method's non-destructive nature makes it well suited for inline quality checks on parts of varying geometry and material.

12:30 – 12:45

Developing Substitute Materials – A Statistical Approach to "Skin" for in vitro Adhesion Testing

[1]University of Applied Sciences Bonn-Rhein-Sieg; DE-Rheinbach
[2]University of Applied Sciences Landshut; DE-Landshut
Alexander Jaekel*[1], M. Wirtz[1,2], C. Dresbach[1]

Abstract:
Adhesive patches are an integral part of the everyday life. However, their origin or development is not questioned, despite occasional inconveniences if a patch does not adhere properly. A patch that peels off easily is as unfavorable as one that rips off the skin during removal.

Balancing both, removal and adhesion, is the subtle art of the adhesive industry. To find this balance, human wear studies are common in industry despite ethical issues, significant economical as well as temporal expenses and highly individual results. Additionally, the reproducibility of manufactured patches is determined by in vitro testing of adhesive strength on steel set by standards for self-adhesive tapes on steel [1,2]. Unfortunately, both, in vivo and in vitro tests, show only a limited correlation.

This leads to the need for specialized skin substitute materials being able to give reproducible results and a significant correlation to the adhesion to human skin. Unfortunately, it is still unknown which properties of skin are essential to its adhesive behavior.

In order to develop such skin substitute materials, this knowledge gap needs to be filled. However, before the importance of each material property for adhesion can be evaluated, a comprehensive material characterization and comparison to skin is required. From an analytical perspective, topographical, physico-chemical and mechanical characteristics of a skin substitute material and their comparability to skin are of interest but exceed an amount of data comprehensive for the human mind.

Since it is essential to have an overview of the collected data and to compare it with the skin, the data must be compressed and presented in a format that is readable by humans. Therefore, mid-level data fusion in combination with multi-criteria optimization and multivariate validation are a convincing approach. First, analytical results are abstracted by comparing them with reference data from human skin. The abstracted data is then sorted into different categories. Finally, the parameters for each category are weighted and summarized. These three steps result in a simplified, comprehensive and accessible dataset. Even though this process is depicted using the example of skin substitute materials, it can be used to compare new materials with a reference. Therefore, it is applicable to develop a green substitute for commercial adhesives or to compare different commercial adhesives with the own products. Nevertheless, the processed dataset is called "Skin Similarity Index". This indexing system and the underlying statistical considerations are discussed in detail.

References:
[1] DIN ISO 29562:2018 (2018) [2] DIN ISO 29863:2018 (2018)

12:45 – 14:00 LUNCH

14:00 – 14:30

Reliable Determination of Weak Adhesive Forces – from the Challenge to a Customized Solution

LUM; DE-Berlin
Stefan Küchler

Abstract:
High adhesive strength is an essential property of coatings, adhesives, sealants and composites in many areas of application, from the automotive sector to applied optics, aerospace and lightweight construction. Various methods for determining adhesive strength are available on the market.

The LUMiFrac Adhesion Analyser has long been established in laboratories around the world in industry and research as a multi-sample analysis system with a very large force range in a single device for these and many other applications.

In this article, we will present the strengths of this analyzer in testing very low adhesive strengths, i.e. in the range between 0.035 and 0.5 MPa, in more detail. This applies, for example, to packaging, medical plasters, printed circuits and organic solar cells. While determining low adhesive strengths in solar cells helps to identify weaknesses in the design, the design of medical plasters is specifically geared towards low adhesion to ensure comfortable wound protection and pain-free plaster removal.

This article explains why CAT technology an advantage over conventional tensile testing machines when determining the tensile and shear adhesion strength of weakly adhering bonds. Particular attention is paid to the special requirements for sample preparation and handling. Substrate-dependent adhesive selection is explicitly included.

As a practical application example, the study of the adhesion of medical plasters is presented in detail. Various development samples were provided by a manufacturer. In consultation with the client, these were first tested for their adhesion to a solid standard substrate. For this purpose, an application-specific test setup was designed and tested. Using a slightly modified test setup, the adhesion of the plaster to (artificial) skin was then examined in a practical application.

Furthermore, the conflicting requirements of mechanical stability and low self-weight of the samples are addressed, which are a typical challenge for weakly adhering bonds. procedure for selecting the measurement method to be used is outlined. We highlight the aspects to be considered in test planning and implementation, such as:

- Reproducibility and sensitivity of the measuring device,
- Derivation of possible adhesion tasks, e.g. plaster - substrate, plaster - artificial skin,

to name a few selected aspects.

How these requirements have been mastered using LUMiFrac is illustrated by way of example in order to shed new light on the world of weakly adhesive bonds.

14:30 – 15:00

Redefining Adhesive Processing: The Impact of 3D-Printed Static Mixers and Nozzles

Innotech Marketing and Konfektion Rot; DE- Mühlhausen
Adrien Schmidt

Abstract:
Static mixing tubes available on the market often fail to meet the specific requirements of certain two-component reactive adhesive systems. Standard injection-moulded mixers often struggle with material throughput, dead volume, impractical length or inadequate mixing performance. As a result, they can compromise bond quality and process efficiency.
3D printed static mixers and nozzles offer a tailor-made alternative, optimising both the mixing process and adhesive application. For each project, we create specifically designed mixers and nozzles based on the adhesive properties and process parameters, enabling the rapid creation of customised solutions that ensure optimal mixing quality, precise adhesive placement and controlled application geometry, while supporting sustainable, on-demand manufacturing.
Based on the adhesive parameters, we are able to create optimised mixers and nozzles tailored to each application - eliminating the need for process compromises.
In past projects, we have been able to significantly improve efficiency by reducing back pressure by up to 80% while maintaining or increasing output volumes. Optimised designs and improved flow dynamics minimise excess material consumption and dead volume by up to 20%. In addition, our solutions reduce the time required by up to 80%, while maintaining precise adhepplication—eliminating the need to adapt processes to standardised components.
Motivation
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15:00 – 15:30

Concepts for the Automated Preparation of Adhesive Test Specimens – From Manual Bonding to Automated Testing

Füll Lab Automation; DE-Ostfildern
Benjamin Gmeiner

Abstract:
The automated preparation of standardized test specimens represents a key element in advancing laboratory automation within the adhesives industry. Especially for mechanical test-ing methods such as tensile shear and tensile strength measurements, the reproducible production of test specimens (e.g., tensile shear specimens or dogbones) is crucial for obtaining meaningful and comparable results.

In this presentation, concepts for an automated system capable of producing such test speci-mens are introduced. The system combines automated dosing, positioning, joining, and curing operations, enabling the consistent and repeatable preparation of adhesive bonds. Using flexible robotic handling and modular process stations, different specimen geometries and material combinations can be realized within one setup. The approach illustrates how established automation technologies can be adapted to the specific requirements of adhesive testing.

Automating specimen production not only increases efficiency and throughput but also im-proves result consistency and data quality. In particular, the higher reproducibility of the pro-duced specimens plays a vital role in quality assurance, ensuring reliable and comparable mechanical test results. Furthermore, it lays the foundation for fully automated end-to-end testing workflows — from adhesive formulation to mechanical characterization — thereby enabling faster development cycles and more reliable quality assurance.

Table Top Exhibition

15:30 – 16:00

Data-Driven Development of Adhesives:
Harmonised Data, LLM Assistance, and In-Silico Variant Prioritisation

[1] LabV Intelligent Solutions; DE-Selb
Charles Jouanique* , Dr. Stefan Thomas*, A. Bräkling, Marc Egelhofer

Abstract:
The development of innovative adhesives faces rising cost, regulatory, and sustainability pressures. The core constraint in R&D is often operational: dispersed records, inconsistent units, missing metadata, and poor traceability. Conventional tools document activity but rarely integrate it, which hinders retrieval, comparison, and reuse, and undermines meaningful use of AI.

We overcome these limitations with a harmonised evidence base: one schema for recipe, process, and test data, automatic capture from instruments, and Enterprise Resource Planning (ERP) integration to secure master data and reduce transfer errors. In a representative implementation, iterations per project, documentation effort, and data-search time decreased substantially.

On this data foundation, we deployed an LLM assistant using **retrieval-augmented generation (RAG)** over the unified schema without model training. It accepts natural-language queries, performs semantic search across formulations, processes and specifications, carries out calculations on structured data, and returns clear, units-normalised visualisations with explicit provenance to source records. This supports data-driven decisions during development and shortens analysis time and overall cycles.

We also show that machine learning (ML), trained on past experiments with known outcomes, can rank formulation variants *in silico* using the same qualified, organisation-specific datasets. It operates in two modes: (a) forward performance prediction and (b) constrained inverse design from target windows. This enables the selection and prioritisation of promising adhesive formulation variants *in silico*, reducing laboratory tests and further shortening development cycles.

We refer to this integrated concept of harmonised data and workflows, with LLM and ML components as M**aterial Intelligence**: a traceable evidence base that supports focused experimentation and faster, defensible decisions in adhesives R&D.

16:00 – 16:30 REFRESHMENT BREAK

16:30 – 17:00

Engineered Debonding on Demand for Advanced and Precision Manufacturing

Polytec PT / Bostik GmbH a part of Arkema Group; DE-Karlsbad
Robert Mattmer

Abstract:
Debonding on demand has become a key requirement in modern manufacturing, where components must be securely fixed during processing and later released cleanly and efficiently. This need is especially evident in precision optics, where lens blanks require stable support during shaping yet must separate without residue or damage. As manufacturing trends continue toward greater precision, higher automation, and more sustainable operations, controlled debonding is emerging as a foundational capability that directly influences workflow design, product quality, and overall process efficiency.

This presentation outlines a holistic view of engineered debonding that prioritizes mechanical robustness during processing, protection during release, and seamless compatibility with both automated and manual production environments. Using optical lens fabrication as an illustrative example, we explore how well-designed bonding interfaces can deliver predictable adhesion behavior and rapid, reliable release without extensive post-cleaning. By emphasizing low-energy, low-waste operation alongside process stability and flexibility, this talk will demonstrate how thoughtful debonding strategies can enhance efficiency and sustainability across optics, electronics, advanced assembly, and other precision-driven industries.

17:00 – 17:30

Display Narrow Border – Challenges for Structural Bonding

Visteon Electronics Germany; DE-Karlsruhe
Manfred Süss

Abstract:
What has long been considered standard in the consumer sector is now increasingly finding its way into car displays – the Narrow Border Display.

A Narrow Border Display describes the distance between the visible area of a display, called the active area, and the external mechanical geometry, and is becoming smaller and smaller.

This area is typically printed with black ink on a cover lens back side where wo do structural bonding against a carrier out of metal or plastic.

This black area must become increasingly smaller, which means that the adhesives must become significantly stronger.

However, it is important to consider the challenges that this reduction in the adhesive surface poses, both for the adhesive and from a mechanical and chemical perspective.

This presentation aims to address these challenges.

17:30 – 18:00

AI In Adhesives - Building a Future Ready Foundation Through Industry Case Studies

Uncountable; DE-München
Tea Pavlek

Abstract:
This talk will explore case studies from industry leaders, highlighting both the successes and pitfalls of integrating AI into adhesives R&D. Attendees will gain insight into lessons learned, practical strategies, and a clear roadmap for building the structured data foundation required to support predictive modeling, automated experimentation, and long-term knowledge retention.

In today's competitive landscape, adhesives companies are under constant pressure to accelerate discovery, shorten development cycles, and commercialize innovations faster than ever. Artificial intelligence and machine learning present powerful opportunities to transform R&D performance—but their success depends on a critical enabler: structured, high-quality lab data.

By investing in structured data today, adhesives R&D organizations can ensure that every experiment conducted adds enduring value—fueling smarter decision-making, faster innovation cycles, and a sustainable competitive advantage in a rapidly evolving market.

Main points of the talk:
Explore real-world success stories from industry leaders who are transforming R&D with artificial intelligence.
Learn from both wins and challenges to understand what it really takes to integrate AI effectively in adhesives innovation.
Gain practical strategies for building the structured, high-quality data foundation that powers predictive modeling and automation.
Discover how data-driven R&D accelerates discovery, boosts innovation, and creates a lasting competitive advantage

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19:00 - 23:00 Networking Dinner | Paulaners Wirtshaus | Westin Grand Hotel

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