

POSTER SESSION

1. Solutions for Sustainable Pressure Sensitive Adhesives

KEVIN BOTTEX

ARAKAWA Europe; DE-Eschborn

Abstract:

In the presented poster, Arakawa presents solutions for environmentally friendly tackifiers. These can be used in different adhesive systems.

Features of resins are presented, including novel developed products.

A special focus on products with high bio-based content is shown.

Arakawa Chemical Industries group provides high quality and environmentally friendly chemical products that are used in the manufacture of adhesives, sealants, printing inks, paints, plastics, coatings, rubber, paper, electronics and other products.

2. Collagen: A Versatile Biobased Binder for Technical Applications

MARIT BALTZER

FILK Freiberg Institute; DE-Freiberg

Abstract:

Collagen is the most important structural protein in the animal kingdom and, centuries ago, served as the basis for traditional adhesive techniques in the form of glutin glue. Despite this long tradition, its potential as a modern, bio-based adhesive raw material has so far been largely overlooked. As a biopolymer, collagen is of biogenic origin, renewable, and biodegradable. Through targeted cross-linking, a water-insoluble form can be produced that can be dissolved again exclusively by enzymatic means. This allows for a combination of defined stability and reversible solubility that traditional, petroleum-based adhesive systems cannot offer.

At FILK, a collagen powder was developed that, through a specific formulation involving the addition of water and glycerin, can be processed into a melt. This melt exhibits classic thermoplastic properties, which is why it was named "Thermoplastic Collagen—TC." It can be formed into films and strands using extrusion processes; injection molding and additive manufacturing processes are also suitable.

This broad range of processing options results in versatile applications as a binder:

(1) As a hot-melt adhesive, TC enables the bonding of paper and cardboard materials. With appropriate pre-processing, sealable material combinations can also be achieved.

(2) In the form of thin films, TC serves as both a bonding and a separating layer between plastic sheets of different material classes, whereby its solubility in water and enzymes is specifically utilized to enable the recycling of composite materials by material type.

(3) In addition, TC is being investigated as a functional separating layer between the anode and cathode in battery systems.

These examples demonstrate the broad potential of thermoplastic collagen as a sustainable alternative to petroleum-based binder systems. As a bio-based raw material, TC opens up new perspectives for traditional and novel adhesive applications across a wide range of industries – from packaging and plastics processing to battery technology.

#collagen #adhesive systems #biobased

3. Closing the Carbon Loop: CO₂ to Cyclic Carbonates to Sustainable Adhesives

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Abstract:

Carbon dioxide (CO₂), is one of the greenhouse gases and also serves as a valuable resource in polymer chemistry. Utilizing CO₂ as a raw material for monomers, various methods have been developed to synthesize CO₂-based polymers, such as poly(hydroxyurethane) (PHU). This strategy not only mitigates CO₂ emissions but also provides a viable alternative to toxic raw materials such as isocyanates and phosgene. The transformation of CO₂ into polymers involves catalytic processes that convert this abundant gas into useful materials, thereby contributing to a circular economy. The fixation of CO₂ into epoxides, employing several readily available, inexpensive, non-toxic and stable compounds as catalysts under mild reaction conditions, such as atmospheric pressure (1 bar). Hotmelt adhesives are a promising application for PHU's. Most adhesive raw materials are still derived from fossil resources, making the development of sustainable alternatives increasingly important. CO₂-based PHUs provide an attractive solution by reducing reliance on petrochemical feedstocks while offering excellent adhesion properties, particularly towards metallic substrates. Moreover, their isocyanate-free synthesis enhances safety and sustainability.

4. Transfer Metallisation Technology – A New Approach for Recyclable Barrier Systems

MARIUS JESDINSZKI

Fraunhofer Institute for Process Engineering and Packaging IVV; DE-Freising

Abstract:

The transition towards a circular packaging economy requires innovative material concepts that combine high barrier performance with improved recyclability. The Barrier Transfer, developed at Fraunhofer IVV, offers a novel approach by decoupling the functional barrier layer from the carrier material during the packaging lifecycle.

Using a transfer-based process, highly functional coating systems can be applied to fiber-based packaging substrates while maintaining the performance required for sensitive food and consumer goods applications. The concept enables the use of tailored barrier coatings and adhesive systems to achieve excellent protection against oxygen, moisture, and aroma loss.

A key advantage of the technology is the possibility of recovering and separating valuable functional materials after use. This creates new opportunities for the development of circular coating and barrier concepts, allowing both fiber materials and functional components to remain within high-value recycling streams. As a result, the technology addresses one of the major challenges of current multilayer packaging structures: combining product protection with material circularity.

The demonstrator presented at MKVS illustrates the transfer process, the interaction between coating, adhesive, and substrate, and the resulting material cycle. It highlights how future barrier systems can be designed to meet increasing sustainability requirements while maintaining the performance standards demanded by modern packaging applications.

5. The Role of Adhesives in the Recycling Process of Food Packaging

DR. STEFAN SCHIESSL

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Abstract:

What role do adhesives play in the recycling of flexible food packaging? Adhesives enable films of the same polymer type to be combined with thin functional barrier layers, creating high-performance monomaterial structures. They can also bond recycled material layers to migration barrier films, while thermoformable adhesives maintain this bond during and after forming into three-dimensional packaging such as trays. This is increasingly relevant given mandatory minimum recycled content requirements from 2030. At the same time, adhesives must not impair mechanical recycling. Selected recycling trials show that crosslinked two-component adhesives may contribute to specks in recycled films and that adhesives can affect recycle colour. The poster highlights these opportunities and challenges, demonstrating why recycling-compatible adhesives are essential for future flexible food packaging.

6. Decoding Odour Perception: Implicit Neurological Pathways in Sensory Analysis

ALINA BEIER

Olfasense; DE-Kiel

Abstract:

Improving fragrance efficiency in consumer goods is increasingly important to reduce formulation load, maintain performance, and support more sustainable product development. Within the EU co-funded SNIFFCON project, sensory neuroscience, olfactometry, and artificial intelligence are combined to better understand odour perception and optimize fragrance concentration in near-market applications. In a preliminary study, 24 participants were exposed to synthetic sweat malodour alone and mixed with a deodorant fragrance at 2% and 1% concentrations, while explicit sensory responses and implicit physiological signals, measured through electroencephalography (EEG) and electrocardiography (ECG), were recorded. Both fragrance-containing mixtures improved hedonic tone and valence compared with malodour alone, with no statistically significant differences between the 1% and 2% concentrations in most measures. These findings suggest that combining explicit sensory evaluation with EEG and ECG can help identify lower fragrance dosages that preserve perceived malodour-masking efficacy in consumer goods applications

7. Sorting Behaviour in Industrial Sorting Plants

MICHAEL SOMMER, DIRK BURTH

Munich University of Applied; DE-München

Abstract:

The PPWR (Packaging and Packaging Waste Regulation) has been in force in Europe since August. This stipulates that all packaging must be recyclable. An important step in this process is the sorting of packaging. There has been a fair amount of research into separation using NIR scanners. The pre-sorting of packaging waste using screens and air separators has not yet been investigated in real-world facilities. The first trials in sorting plants were carried out at Munich University of Applied Sciences.

8. Composting of Biobased Resins

CAROLINE JAAP, DIRK BURTH

Munich University of Applied; DE-München

Abstract:

Resins are indeed a bio-based material, but they often serve the purpose of protecting plants from bacteria. So, the question is how good the biodegradability of resins and of coatings with resins is. A composting test setup was built for this, and composting tests were carried out.