

Evonik unveils innovative “Debonding on Demand” concept for more sustainable adhesives

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- New debonding approach enhances material recyclability and repairability in modern manufacturing processes
- Demonstrates significant cohesive strength loss after heat treatment in 1k and 2K-adhesive system applications
- Designed to integrate with existing technologies, promoting operational flexibility

Main press contact

Leticia Jimenez Buil

Head of Market Communications
Comfort & Insulation
Phone + 49 201 173 3656
leticia.jimenez-buil@evonik.com

Alternative press contact

Holger Seier

Head of Innovation Marketing
Research, Development & Innovation
Phone + 49 151 538 31 577
Holger.seier@evonik.com

Essen, Germany. Evonik has developed a breakthrough "Debonding on Demand" concept to meet the growing requirements of today's manufacturing industry to increase circularity by improving the sustainability of adhesives. Developed in collaboration between Evonik's strategic innovation unit and business incubator, Creavis, and advanced polyurethane experts from the Comfort & Insulation business line, this innovative technology aims to address the pressing need for adhesives that can be easily removed for recycling and repair.

Adhesives are essential for modern manufacturing because they allow for efficient assembly, bonding of diverse materials, and lightweight construction. However, traditional adhesives can present challenges when it comes to the repair and recycling of bonded components. Evonik's innovative debonding on demand technology addresses these challenges by leveraging reversible or cleavable covalent bonds as the foundation of the chemical network, ensuring economic viability and operational efficiency. This new development is highly applicable and will complement existing debonding technologies, such as stretch-and-detach or electric debonding, making it an attractive option for a wide range of industries. It has the potential to transform the circular economy by making the disassembly and recycling of products easier and more efficient.

“Despite the growing demand for debondable adhesives, to date there have been limited effective solutions available in the market to make disassembling material parts easier, said Dr. Nicolai Kolb, Manager Business Development at Creavis. “Evonik is committed

Evonik Industries AG

Rellinghauser Straße 1-11
45128 Essen
Germany
Phone +49 201 177-01
Fax +49 201 177-3475
www.evonik.com

Supervisory Board

Bernd Tönjes, Chairman

Executive Board

Christian Kullmann, Chairman

Lauren Kjeldsen

Dr. Claudine Mollenkopf

Maike Schuh

Thomas Wessel

to leading the way in adhesive innovation and our new approach is a positive step forward in developing more sustainable adhesive solutions that align with the principles of the circular economy.”

This innovative approach is compatible with existing adhesive technologies, including polyurethanes, enabling integration into existing manufacturing processes. The new debonding on demand concept from Evonik has low viscosity, enhancing ease of use in various applications. It offers a flexible range of debonding temperatures (80–150°C), compatible with both 1K and 2K adhesive systems, making it suitable for a wide range of applications.

“The development of this breakthrough technology is particularly timely, as regulatory pressures and sustainability concerns continue to shape the adhesive market,” said Dr. Christian Brandl, Technology Manager Advanced Polyurethanes, Comfort & Insulation business line. “We are excited by the potential of our new debonding on demand concept to meet these regulatory requirements by offering significant advantages in terms of material recovery, waste reduction, and product longevity.”

Evonik is currently collaborating with selected players in the adhesive market to prepare market demonstrators for this innovative technology. Initial proof of concept trials have shown promising results, indicating significant loss of cohesive strength after heat treatment, further validating the effectiveness of the debonding process.



Photo caption: Evonik’s introduction of Debonding on Demand at the European Coatings Show. From left to right: Dr. Alexander Azzawi, Dr Kai-Oliver Feldmann and Dr. Christian Brandl.

About Evonik

Evonik is one of the world leaders in specialty chemicals. The company is active in more than 100 countries around the world and generated sales of €15.2 billion and an operating profit (adjusted EBITDA) of €2.1 billion in 2024. Evonik goes far beyond chemistry to create innovative, profitable, and sustainable solutions for customers. About 32,000 employees work together for a common purpose: We want to improve life today and tomorrow.

About Creavis

Creavis is the strategic innovation unit and business incubator of Evonik. For more than 25 years, it has been paving the way for new technologies and innovative business models that make a livable future possible. Its approximately 200 employees worldwide develop sustainable solutions for key challenges arising from climate change and population growth. In doing so, they drive new economic ecosystems and value chains.

About Custom Solutions

The Custom Solutions segment focuses on innovation-driven, tailor-made solutions for customers in specific growth markets. These solutions include additives for coatings, adhesives and sealants, polyurethane foams and lubricants, catalysts, and ingredients for the cosmetics, cleaning and pharmaceutical industries. In 2024, the segment generated sales of €5.7 billion with around 7,000 employees.

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