

## Evonik makes automotive clear coats even more scratch-resistant

- New technology platform for silane-modified binders
- Silane-modified polyurethane binders for automotive clear coats are becoming competitive
- New facility for producing the key component—silyl isocyanate—is already up and running

Evonik Industries is paving the way for a new technology whose applications include automotive finishes that are more scratch-resistant than ever before. The specialty chemicals company has developed an industrial-scale method for producing silane-modified binders for automotive finishes. The advantage of these silane-modified binders: silane groups increase crosslinking density, making it possible to create automotive finishes that are flexible yet harder, leading to improved scratch resistance.

The basic concept behind the new technology was already known: modifying classic binders with silanes noticeably improves the binder properties. This also applies to the polyurethane binders typically used for automotive finishes. Up to now, however, production of silane-modified polyurethane binders has been so complex and expensive that these products have only been made on a small scale for applications such as high-performance adhesives. For more general uses and for large-scale applications such as automotive finishes, however, there simply has not been enough available. The new technology from Evonik stands to change all of that.

Gerd Brand, head of the Crosslinkers Business Line within the Coatings & Additives Business Unit at Evonik, says: “The key factors in our success have been Evonik’s comprehensive expertise in silane and isocyanate chemistry, our understanding of the market, and our intense collaboration with prominent players in the automotive and coatings industries.”

The breakthrough came when the specialty chemicals company developed its own manufacturing process for the silyl isocyanate IPMS, or (3-isocyanatopropyl) trimethoxysilane. It is the critical building block for producing silane-modified binders. Evonik has

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**Contact person economic press**  
**Dr. Edda Schulze**  
Corporate Press  
Phone +49 201 177-2225  
Fax +49 201 177-3030  
edda.schulze@evonik.com

**Contact person specialized press**  
**Dr. Karin Aßmann**  
Corporate Innovation Strategy & Management  
Phone +49 6181 59 12230  
Fax +49 6181 59 712230  
karin.assmann@evonik.com

**Evonik Industries AG**  
Rellinghauser Straße 1-11  
45128 Essen  
Germany  
Phone +49 201 177-01  
Telefax +49 201 177-3475  
www.evonik.de

**Supervisory Board**  
Dr. Werner Müller, Chairman  
**Executive Board**  
Dr. Klaus Engel, Chairman  
Thomas Wessel  
Patrik Wohlhauser  
Ute Wolf

Registered office Essen  
Registered court  
Essen local court  
Commercial registry B 19474  
VAT ID no. DE 811160003

been producing IPMS in a new facility in Marl (Germany) since mid-2013. Dr. Ulrich Küsthardt, head of the Coatings & Additives Business Unit at Evonik, points out: “With the new facility, Evonik creates its access to IPMS and to a new group of customized, silane-modified binders.”

By using IPMS and selecting the right additional raw materials, Evonik can adapt coating binders to the needs of its customers. Evonik, in other words, can provide coating formulators with binders tailored to their final applications.

One of the first applications for the new IPMS binders is the thin clear coating—only about 40 micrometers thick—that serves as the glossy top layer of an automotive finish. In addition to improved scratch resistance, the new systems are just as resistant to chemicals and the elements as traditional two-component polyurethane coatings. Plus, silane-modified binders are completely compatible with two-component polyurethane coatings and significantly improve their properties. For car manufacturers, that means being able to use their usual production lines for applying coatings that contain the innovative binder. Selected automakers have already taken the first steps toward approving clear finishes that have been modified in this way.

Dr. Hans Görlitzer, however, who works in the Coatings & Additives Business Unit at Evonik as head of business development in the Crosslinkers Business Line, believes the new technology has even more potential: “We aim to open up access to silane-modified binders for other applications too.” As examples, he cites coatings for wood, plastics, metal, and high-tech adhesives. The key criterion here is that the silane-crosslinked clear coats cure quickly enough at room temperature.

For more information, please see the new issue 46 of elements, Evonik’s science newsletter:

<http://corporate.evonik.com/en/media/publications/elements/Pages/default.aspx>

### **Company information**

Evonik, the creative industrial group from Germany, is one of the world leaders in specialty chemicals. Profitable growth and a sustained increase in the value of the company form the heart of Evonik's corporate strategy. Its activities focus on the key megatrends health, nutrition, resource efficiency and globalization. Evonik benefits specifically from its innovative prowess and integrated technology platforms.

Evonik is active in over 100 countries around the world. In fiscal 2013 more than 33,500 employees generated sales of around €12.9 billion and an operating profit (adjusted EBITDA) of about €2.0 billion.

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