

News Release

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Merck KGaA, Darmstadt, Germany, Showcases Innovative Materials for Modern Lighting Systems at ISAL

- **Extensive range of materials from Merck KGaA, Darmstadt, Germany for the manufacture and application of LED components**
- **Novel packaging materials improve LED module production processes**
- **Smart LC and OLED materials enable high-performance lighting systems**
- **Functional pigments as circuit carriers in powder coatings and polymers for novel lighting applications**

Darmstadt, Germany, September 14, 2017 – Merck KGaA, Darmstadt, Germany, a leading science and technology company, is once again demonstrating its extensive expertise in the field of innovative materials for modern lighting systems at the International Symposium on Automotive Lighting (ISAL). This extends from LED technology itself to the manufacturing processes, which in turn are promoting the rapid advance of LED headlight systems in the automotive sector.

The renowned symposium, which is held every two years by the Technical University of Darmstadt, is taking place from September 25 to 26, 2017. This year, Merck KGaA, Darmstadt, Germany, will be highlighting a novel packaging technology. It offers manufacturers of LED applications a multitude of advantages. As a second area of focus, Merck KGaA, Darmstadt, Germany, will be presenting new OLED materials.

Dieter Schroth, Head of the Merck Automotive Platform, explains, "Owing to our unique position as a material supplier for all stages of the LED value chain, we can provide solutions for industrial production. As the innovative leader in both LED and

Page 1 of 3



OLED materials, Merck KGaA, Darmstadt, Germany, is a key partner to the automotive industry and its suppliers."

Innovative packaging materials with advantages in all areas

Novel binders will also be debuting at the ISAL. These packaging materials could replace silicon in the application of phosphors to the LED chips. In comparison with previous solutions, they offer a range of technical advantages. For instance, they have long-term stability and do not discolor; comparable silicon products lose optical transparency. As a single-component system, they are easy to use in the industrial process and do not have any restrictions in terms of processing time. The novel binders feature a broad viscosity range for different applications; they have high thermal and mechanical stability and superb barrier properties.

These qualities make them especially attractive in product segments that place increasing importance on quality and reliability.

OLED technology for bright and striking rear lights

A further focus of the ISAL is on OLED. Rear lights with OLED materials from Merck KGaA, Darmstadt, Germany, are already being used in vehicles such as the Audi TT, Audi A8 and the BMW M4. The extremely thin and very lightweight OLEDs emit diffuse light, thereby offering automotive manufacturers significant construction advantages since the components require less space and do not require cooling. They provide largely dazzle-free illumination using a low direct current voltage and they are easily recognizable from all viewing angles. With OLEDs, Merck KGaA, Darmstadt, Germany, is demonstrating the vast application potential of this technology. In the future, flexible OLED lighting sources that can be mounted onto bendable surfaces will be ubiquitous. Your benefit: The flat modules can be designed in nearly any desired shape, giving automotive designers even more freedom.

Smart LC materials for headlights

Headlights with liquid crystal shutters go a step further than conventional systems as they adjust the light distribution as needed in real time. The necessary displays with liquid crystals from Merck KGaA, Darmstadt, Germany, have a matrix of 100 x 300 pixels and permit fully adaptive light projection onto the road. Optimum road lighting in the dark improves traffic safety and makes driving a little easier. Individual areas can be blocked out, for instance when a vehicle is approaching from

the opposite direction or headlights shine on highly reflective elements. New, highly complex functions such as projected navigation arrows are also possible. Hella, a lighting and electronic components expert, wants to bring this technology to the market together with Merck KGaA, Darmstadt, Germany, and other partners.

New approaches with functional pigments for lighting applications

At the ISAL, functional pigments for lighting applications will offer a glimpse of the future. With pigments from the Iriotec 8000 series, circuit layouts can be integrated into injection-molded components or powder-coated components in laser direct structuring (LDS) processes. The high thermal conductivity of the metal carrier is combined with the circuit layout on the surface. Laser structuring of the components offers tremendous design freedom, especially since these pigments also enable light-colored design in addition to dark modules.

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