PRESS RELEASE

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Public funded OLED project So-Light successfully concluded

Eleven leading German OLED companies and research institutions announced the successful completion of the OLED (Organic Light Emitting Diode) related project; So-Light.

This € 14.7 m project was supported by the German Ministry of Education and Research (BMBF) over a three and a half year period and addressed the complete value chain, from primary OLED materials through to OLED-lighting applications. Several of the promising innovations created within the project will now be brought to market by the participants of the So-Light project

The project partners Novaled, Sensient, University Muenster, Fraunhofer-COMEDD, AIXTRON, LEDON OLED Lighting, Fresnel Optics, HELLA, Siteco, BMG MIS (former AEG MIS) and the University of Paderborn/L-LAB cooperated in a variety of OLED technology areas. These activities created several innovative results related to materials, processes, optical elements and process integration. For some specific applications prototypes have been developed for OLED-signage and speciality applications for markets such as automotive, architectural lighting and transport. The aim of So-Light was to combine as many of the materials and component related results into design studies and prototypes in order to strengthen Germany's leading role in the growing OLED-market.

„The results of So-Light indeed exceeded my expectations", said Dr. Blochwitz-Nimoth, So-Light Consortium Manager and CSO of Novaled AG. "We achieved many outstanding successes based on the fruitful cooperation of so many players along the whole value chain and the passion of every single partner. Our design studies and prototypes already show the far reaching possibilities of OLED technology for commercialization in lighting applications and support the beauty, elegance and uniqueness of the OLED light source."

In detail the project generated the following results:

- New Materials:
  - Novaled and Sensient jointly developed a new p-doped hole transport system with potential for lower absorption and lower cost scaleability than previous materials. The jointly developed materials will be commercialized by Novaled.
  - Novaled made significant progress towards a fully air-stable n-doped electron transport layer. After more R&D work it is expected that this will lead to a commercial offering.
  - Sensient developed new host materials for OLED emitter layers which gave rise to efficiency enhancements in a reference OLED.
  - The University of Muenster, together with Sensient, synthesized new platinum(II)-complexes. Used as triplet emitters, they enabled outstanding high quantum efficiencies for Pt(II) complexes of up to 75% (for green) and high current efficiencies of up to 16cd/A (green-yellow colour).

- Novel Processes:
  - AIXTRON and COMEDD jointly optimized the OVPD® (Organic Vapour Phase deposition) process on a Gen2 substrate size. The capability of this tool was demonstrated with the evaporation of the new p-HTL system developed by Novaled and Sensient.
  - In addition, AIXTRON demonstrated a new high deposition rate process based on their novel STExS source concept. Evaporation rates of above 40 Angstrom/second

were achieved for the p-HTL system with significantly reduced thermal exposure of the materials involved. This will allow much faster processing of sensitive organic materials compared to the current conventional process technology.

- Novel panel-technologies:
  - LEDON OLED Lighting developed an efficient and robust electrical contacting technology which also enabled better system efficiency and homogeneity.
  - In addition the use of a special rear surface heat distribution unit gave rise to better OLED emission uniformity without materially altering the level profile of an OLED panel.
- Novel optical technologies:
  - Fresnel Optics successfully processed an external flat primary optics directly on the rear surface of an OLED-panel including new features such as structured apertures or structured silvering.

- Novel qualification methods:
  - The University of Paderborn/L-LAB gathered photometric data on OLEDs specifically related to lifetime, lumen maintenance, illumination, color uniformity and UV degradation.

- Novel large area OLED panels from COMEDD (TABOLA®) with an estimated MTTF (mean time to failure) of 20.000 hours have been used for design studies:
  - HELLA made design studies for automotive indoor lighting and for a car rear-light with red OLEDs.
  - Siteco manufactured a suspension luminaire containing OLEDs, point source LEDs and an exterior luminaire for building façade integration.
  - BMB MIS developed a thin OLED backlight for LCD-signage application. These elements form the basis for a modular construction of ultra thin large area LCD-signage for the transportation business.

Picture 1: HELLA car rear-light based on 16 red OLEDs.

Picture 2: Suspension luminaire made by Siteco using OLEDs and LEDs

So-Light Partner
Novaled AG (Dresden) www.novaled.com, Sensient Imaging Technologies GmbH (Bitterfeld-Wolfen) www.sensient-tech.com , Fraunhofer COMEDD (ex FhG-IPMS, Dresden) www.comedd.fraunhofer.de, LEDON OLED Lighting GmbH & Co. KG (Dresden) www.ledonoled.com, AIXTRON SE (Aachen) www.aixtron.com, Fresnel Optics GmbH (Apolda) www.fresnel-optics.de, Hella KGaA Hueck & Co (Lippstadt) www.hella.com, Siteco Beleuchtungstechnik GmbH (Traunreut) www.siteco.de, BMG MIS GmbH (Ulm) www.bmgmis.de, University of Paderborn/L-LAB (Lippstadt) www.l-lab.de, University of Muenster (Münster) www.uni-muenster.de

About OLEDs
OLEDs (organic light-emitting diodes) are solid-state devices composed of multiple thin layers of organic materials often only a few manometers thick that emit diffuse light when electricity is applied to them. Because they are an area light source, OLEDs are a key part of fulfilling the dream of the rapidly growing flat panel display market: paper-thin, highly- efficient displays with brilliant colours and excellent design flexibility. OLEDs may also lead to new lighting products that combine colour and shape to create innovative decorative lighting applications and personalized environments. In addition, OLED lighting products have the potential to offer greater cost and energy savings than current lighting technologies.

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