

**Pressemitteilung****Fraunhofer-Institut für Angewandte Polymerforschung IAP****Dr. Sandra Mehlhase**

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<http://idw-online.de/de/news809992>Forschungsprojekte, Wissenschaftliche Tagungen  
Chemie, Elektrotechnik, Energie, Werkstoffwissenschaften  
überregional**LOPEC 2023: Printed electronics - thin, brilliant, stretchable**

Quantum materials for electroluminescent QD-LED displays, fast inline monitoring for thin film printing or stretchable printed electrodes. Scientists from the Fraunhofer Institute for Applied Polymer Research IAP in the Potsdam Science Park demonstrate what is already technologically possible in the field of printed electronics and present current projects at LOPEC 2023 in Munich from March 1 to 2 (ICM, booth FO.16). LOPEC is the leading trade fair and the most important congress for printed electronics.

**Inks for brilliant displays**

They are extremely thin, shine in brilliant colors and can even be printed on flexible films - electroluminescent QD-LED displays. What makes them so special are the inks they are printed with: novel quantum dots (QD) make it possible for each pixel of a display to emit light of a defined color when current is applied. Compared to conventional QD-LED displays, in which the display pixels are backlit with blue light, the new electroluminescent QD-LED displays offer several advantages. They promise to be even more energy-saving, efficient and cost-effective. Above all, the elimination of backlighting makes the electroluminescent QD-LED displays thinner.

As part of the EU project Hi-Accuracy, scientists at Fraunhofer IAP are working with 11 partners to develop materials and methods for manufacturing high-resolution and flexible displays. At Fraunhofer IAP, novel inks based on quantum materials and printing processes for electroluminescent QD-LED displays are being developed to make them even more powerful and efficient than before. The goal: a display resolution of more than 300 ppi. To achieve this, the electrohydrodynamic jetting process (EHDJET) is being further developed, a method that enables the QD-LED inks to be printed with an accuracy of four micrometers.

**Fast troubleshooting even during the printing process**

Particularly with regard to the optimization of printing processes in which various ultra-thin layers with different functions and properties are printed on top of each other, quality control plays an elementary role during this process. Is the layer morphologically homogeneous? Are there irregularities in the layer thickness? What is the chemical composition? In the future, manufacturers who use not only printing processes but also other coating methods such as atomic layer deposition (ALD), roll-to-roll coating in a vacuum or sintering processes will be able to answer these questions during the coating process or immediately afterwards.

As part of the EU project NanoQI, the Fraunhofer IAP research team, together with nine partners from industry and science, is developing a very fast and highly sensitive inline measurement technique to detect the quality of thin films. For this purpose, the information from three characterization methods is combined: X-ray diffraction (XRD), X-ray reflectometric measurements (XRR) and hyperspectral imaging (HSI).

At Fraunhofer IAP, hyperspectral imaging is being further developed. This uses a hyperspectral camera that records the entire light spectrum from 400 nm up to 960 nm during the measurement. The team compares the captured data with X-ray measurements to draw conclusions about various quality characteristics of the coatings. This enables the HSI to be calibrated so that in future X-ray measurements can be omitted with altogether and only HSI technology can be used. It offers a major advantage for industrial customers, as it can be easily integrated into existing production facilities and does not require any radiation protection measures.

More topics on printed electronics at LOPEC

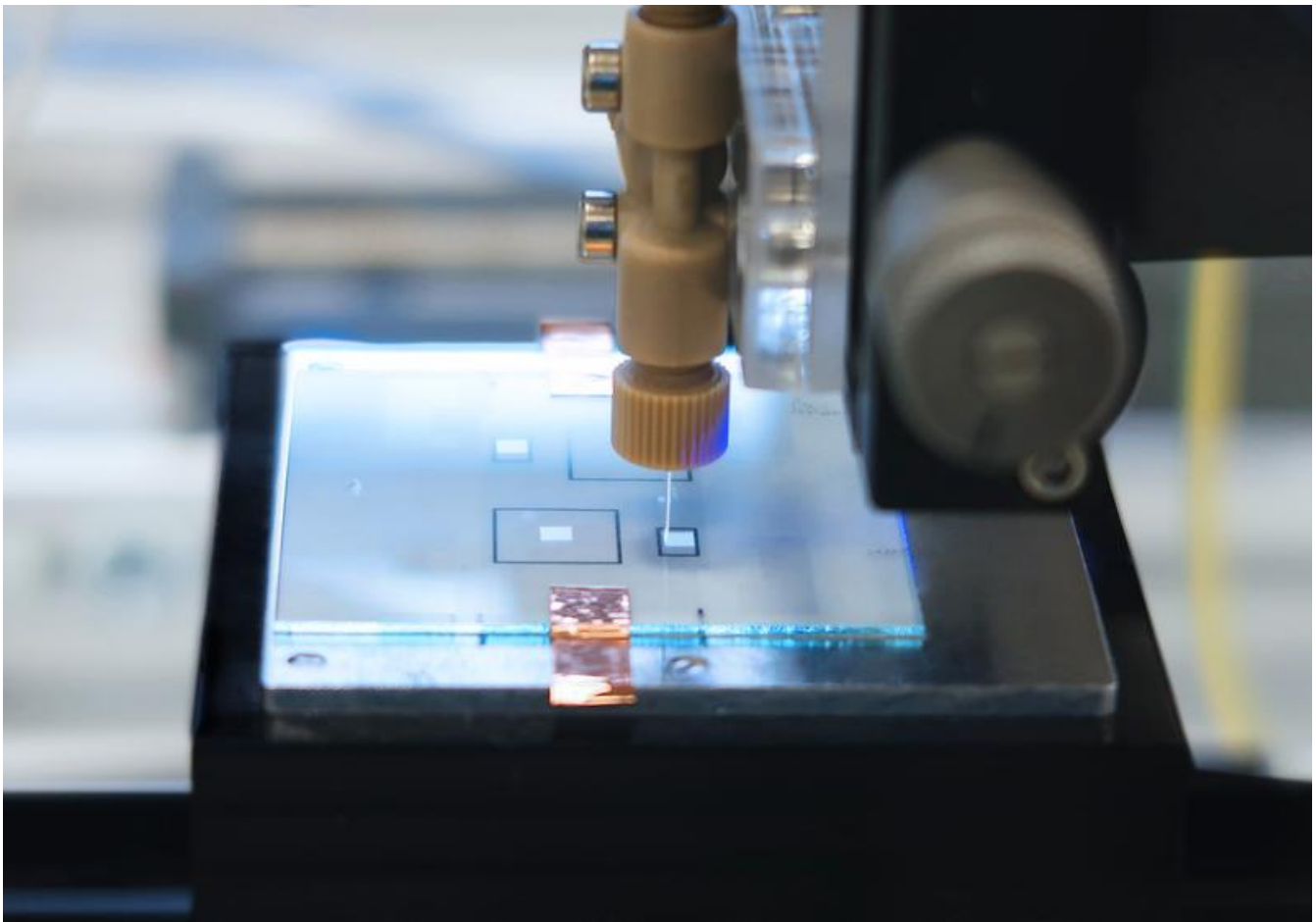
In addition to the latest generation of QD-LED display, Fraunhofer IAP scientists present transparent and fully solution-processed OLEDs as well as sensors, actuators and stretchable electrodes for industrial applications. They provide insights into customized material development, process optimization and innovative printing technologies.

URL zur Pressemitteilung: [https://www.iap.fraunhofer.de/en/research/functional\\_polymer\\_systems/functional-materials-and-devices-2/ink-formulation.html](https://www.iap.fraunhofer.de/en/research/functional_polymer_systems/functional-materials-and-devices-2/ink-formulation.html) Formulation of inks

URL zur Pressemitteilung:  
[https://www.iap.fraunhofer.de/en/research/functional\\_polymer\\_systems/sensors\\_and\\_actuators.html](https://www.iap.fraunhofer.de/en/research/functional_polymer_systems/sensors_and_actuators.html) Stretchable electrodes, sensors and actuators

URL zur Pressemitteilung: <https://www.hi-accuracy.eu/> EU project Hi-Accuracy

URL zur Pressemitteilung: <https://nanoqi.eu/> EU project NanoQI



EHDJET printing with high resolution on conductive glass.  
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