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Flexible electronics without sintering - successful small-scale production of new hybrid inks

Research scientists at INM – Leibniz Institute for New Materials have developed a sinter-free conductive ink based on gold and silver nanoparticles coated with conductive polymers. INM's hybrid inks enable inkjet printing of conductive structures without any thermal or UV treatments. The inks can be prepared in polar solvents such as water and alcohols, and many of their properties such as their density or viscosity can be customized. Testing samples will be available upon request.

The developers will demonstrate their hybrid inks at stand B46 in hall 2 at this year's Hannover Messe, which takes place from April 23 to 27.

Conductive inks are widely used in to print electronics. They are suitable materials for flexible photovoltaics, lighting, touch screen electronics, wearable devices, large-area heaters, sensors, 3D conformal antennas, and health and biomedical applications, among others. Existing inks require annealing after inkjet printing before they become conductive.

"Our new hybrid inks become conductive immediately upon drying, are mechanically flexible, and compatible to inkjet printing," explains the INM materials scientist Tobias Kraus. "The hybrid inks contain a small organic polymer fraction that helps to maintain its electrical conductivity, even if the substrate material is bent," Kraus continues. This enables printing on almost any substrate, like foil, paper, or textiles, since the final annealing steps at relatively high temperatures are avoided.

INM scientists have recently scaled the production of these hybrid inks to a level that is sufficient for small-scale production. "The scaling of nanostructured products requires optimized processes in order to maintain quality while lower prices," says Kraus. Samples of the material are now available for testing applications.

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INM

INM – Leibniz Institute for New Materials, situated in Saarbrücken, is an internationally leading centre for materials research. INM conducts research and development to create new materials – for today, tomorrow and beyond. Research at INM is performed in three fields: Nanocomposite Technology, Interface Materials, and Bio Interfaces. INM is an institute of the Leibniz Association and has about 240 employees.