

Proceedings

Electronic Multiscale Hybrid Materials: Sinter-Free Inks, Printed Transparent Grids, and Soft Devices [†]

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Abstract: Hybrid electronic materials combine the excellent electronic properties of metals and semiconductors with the mechanical flexibility, ease of processing, and optical transparency of polymers. This talk will discuss hybrids that combine organic and inorganic components at different scales. Metallic and semiconductor nanoparticle cores are coated with conductive polymer shells to create “hybrid inks” that can be inkjet-printed and form conductive leads without any sintering step. Transparent electrodes are printed using ultrathin metal nanowires with core diameters below 2 nm. The chemically synthesized wires spontaneously form percolating structures when patterned with a soft stamp; this rapidly yields optically transparent grid electrodes, even on demanding soft substrates. These new hybrid electronic materials enable the fabrication of soft electronics, including flexible sensors on polymer foils, radio-frequency identification (RFID) antennae on cardboard, and soft human–machine interfaces. Selected devices will be covered at the end of the talk.

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