

Direct Sensing of the Liquid-Phase Analytes by Using Chemical Sensors Based on Cross-Linked Polymer Semiconductors

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Sensors based on organic field-effect transistors (OFETs) have various advantages compared with a traditional inorganic sensor, including light-weight, low cost, solution processibility, and flexibility. However, conjugated polymers have poor chemical resistance toward liquid-phase organic solvents, which limits practical applications to commercial electronic devices. Herein, we demonstrate OFET-based chemical sensors that have solution processibility and excellent solvent-resistance by using cross-linkable organic semiconductors. In addition, we fabricate high-performance OFET-based chemical sensors by depositing calixarene derivatives. Various liquid-phase analytes have been detected successfully and reliable sensing responses have been obtained. Our research demonstrates a novel methodology for the fabrication of high-performance organic sensors and could extend the practical applications of OFET-based sensors.

Keywords: cross-linking, polymer semiconductors, chemical sensors