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Single-Crystal Poly(3,4-ethylenedioxythiopene) Nanowires as Electrodes for Field-Effect Transistors

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We develop single-crystal poly(3,4-ethylenedioxythiopene nanowires using liquid-bridge-mediated nanotransfer printing via vapor phase polymerization. This direct printing method can simultaneously enable the synthesis, alignment and patterning of the nanowires from molecular ink solutions. Two- or three-dimensional complex structures of various single-crystal organic nanowires were directly fabricated over a large area using many types of molecular inks. This method is capable of generating several optoelectronic devices. LB-nTM is based on the direct transfer of various materials from a mold to a substrate via a liquid bridge between them. To demonstrate its usefulness, we used LB-nTM to fabricate nanowire field-effect transistors and arrays of 6,13-bis (triisopropyl- silylethynyl) pentacene (TIPS-PEN) nanowire field-effect transistors.

Keywords: Single crystal, Nanowire, Poly (3,4-ethylenedioxythiophene), Liquid-bridge-mediated nano-transfer molding, Vapor-phase polymerization