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Conjugated Polymer Nanowires: Preparation, Morphology, Optical Properties and Field-Effect Transistors AMIT BABEL, YAN ZHU, DAN LI, YOUNAN XIA, SAMSON A. JENEKHE, Department of Chemical Engineering and Department of Chemistry, University of Washington, Seattle, WA. — Nanowires of conjugated polymers are ideal system for studying 1-D confinement effects on optical and electrical properties and hold promise as building blocks for nanoelectronics. We have prepared high quality nanowires of conjugated polymer semiconductors, such as poly(3-hexylthiophene) (PHT), poly(4-hexylquinoline) (PHQ), poly[2-methoxy-5-(2-ethylhexyloxy)-1,4-phenylenevinylene] (MEHPPV), poly(9,9-dioctylfluorene) (PFO) and their blends, using self-assembly and electrospinning techniques and investigated their morphological, optical and electrical properties. Self-assembled crystalline nanowires of binary blends of regioregular PHT and PHQ showed good ambipolar charge transport with hole and electron mobilities of 0.012 and 0.004 cm^2/Vs, respectively. Electrospun fibers of MEH-PPV and its blends with PHT and PFO had diameters of 30-500 nm and tunable optical and charge transport properties. *p*-Channel field-effect transistors based on the MEH-PPV/PHT blend nanofibers had hole mobility of up to 1×10^{-4} cm^2/Vs.

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