

Fabrication of Single Crystal Poly(3,4-ethylenedioxythiophene) Nanowire Arrays

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We have studied a fabrication of vapor phase polymerized Poly(3,4-ethylenedioxythiophene) (PEDOT) nanowire arrays for the first time. The vapor-phase polymerization (VPP) technique is a bottom-up processing method that utilizes the organic arrangement of macromolecules to easily produce ordered aggregates, including on the nanoscale, or prepare thin films of self-assembled molecules, micro-patterns, or modified microstructures of pure conducting polymers. Also, liquid-bridge-mediated nanotransfer molding (LB-nTM), which was reported as a new direct patterning method recently, is for the arrayed formation of two- or three-dimensional structures with feature sizes as small as tens of nanometers over large areas up to 4 inches across and is based on the direct transfer of various materials from a mould to a substrate through a liquid bridge between them. The PEDOT nanowires grown by VPP method and transferred on a substrate to use LB-nTM method have been fabricated to single crystal PEDOT nanowires investigated Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Selected Area Electron Diffraction (SAED), X-Ray Diffraction (XRD), X-ray Photoelectron Spectroscopy (XPS), and electrical properties.

Keywords: PEDOT, Nanowire, Single crystal, Vapor phase polymerization, Liquid-bridge-mediated nanotransfer molding