

Modification Study of Conducting Polymer Nanowire through Electron-Beam Irradiation

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We synthesized conducting polypyrrole (PPy) and poly (3,4-ethylenedioxythiophene) (PEDOT) nanowires through electrochemical polymerization method using nanoporous alumina (Al_2O_3) templates. Electron-beam using linear electron accelerator was irradiated onto the PPy and PEDOT nanowires with the Al_2O_3 template. After electron-beam irradiation, Al_2O_3 template was removed by using hydrofluoric acid solvent, and then the isolated single strand of PPy or PEDOT nanowires was obtained. To discern structural and conformational changes of the electron-beam irradiated PPy and PEDOT nanowires, Fourier transform-infrared, Raman, ultraviolet-visible absorption, and X-ray photoelectron spectroscopy were performed for the nanowires. The current-voltage (I - V) characteristics of the single strand of the electron-beam irradiated PPy or PEDOT nanowires were investigated through conducting atomic force microscope. [Electron-beam irradiation was supported by Korea Atomic Energy Institute.]

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