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ABSTRACT BOOK

Electron-beam Treatment on Conjugated Polymer Nanomaterials

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We report on the effects of unfocused/focused electron (E)-beam treatments on the conjugated polymer nanomaterials, such as light-emitting poly (3-methylthiophene) (P3MT) nanotubes (NTs) and conducting polypyrrole (PPy) and poly (3,4-ethylenedioxythiophene) (PEDOT) nanowires (NWs). The conformational changes and dedoping effects of the conjugated polymer nanomaterials due to the E-beam treatment were investigated by Raman and ultraviolet-visible absorption spectra. From the laser confocal microscope (LCM) photoluminescence (PL) experiments for the P3MT single NT, the significant red-shift and enhancement of the LCM PL peaks through the unfocused E-beam were observed. Comparing the current-voltage characteristics between the pristine (i.e. without E-beam) and E-beam treated PPy and PEDOT NWs, the conducting states of pristine polymer NWs transferred to the non-conducting states. Using the focused E-beam, partial and fine modification of the P3MT single NW in nanoscale had been successfully performed. The optical properties of various light-emitting and dual-colors barcode NWs, fabricated through the focused E-beam treatment on P3MT single NW, are discussed using the LCM PL images and spectra.