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ABSTRACT BOOK

Characteristics of Hydrothermal Treated Poly (3-hexylthiophene) Nanoparticles

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Poly (3-hexylthiophene) (P3HT) nanoparticles (NPs) in aqueous suspension were prepared by re-precipitation method. The optical and structural properties of pristine P3HT NPs (diameter ≤ 100 nm) were similar to those of P3HT bulky film, based on UV/Vis absorption, PL, Raman, X-ray diffraction characteristics. High pressure and temperature were applied to the pristine P3HT NPs through the hydrothermal process, varying temperature from 60°C to 180°C. The surface morphology of hydrothermal treated P3HT NPs was investigated through TEM and SEM images. The UV/Vis absorption and PL spectra for hydrothermal treated P3HT NPs have three-characteristic peaks, whose contributions were dependent on the hydrothermal temperature. The main peaks of the laser confocal microscope PL and UV/Vis absorption spectra were red-shifted for the hydrothermal treated P3HT NPs, because of the applied high pressure and temperature. From the results of XRD patterns and Raman spectra, we found that optical properties of the P3HT NPs can be tuned through the interchain interaction induced by the hydrothermal treatment. The optoelectronic applications using the pristine and hydrothermal treated P3HT NPs are also presented.