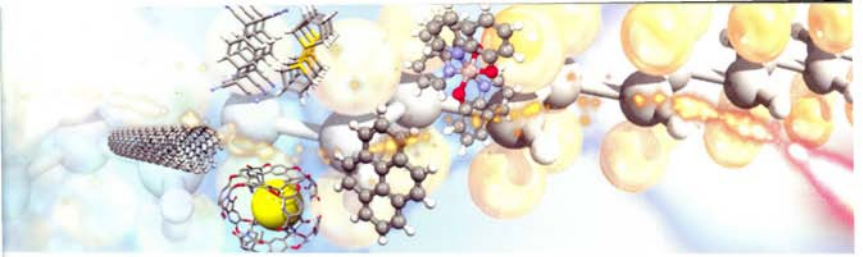

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Optoelectronic Characteristics of Self-Assembled Organic Copper phthalocyanine Nanowires and Rectangular Nanotubes

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We fabricated organic semiconducting copper phthalocyanine (CuPc) nanowires (NWs) by chemically self-assembly method with trifluoroacetic acid in chloroform solution. The mechanism of the chemical self-assembly for the CuPc NWs was studied through FT-IR spectra. After the hydrothermal process, the α-phase CuPc NWs were structurally transformed to β-phase CuPc hollowed rectangular nanotubes (NTs). The optical and electrical characteristics of the β-phase crystalline CuPc rectangular NTs are compared with those of α-phase CuPc NWs, using UV/Vis absorption spectra and light/dark current-voltage characteristics. The β-phase crystalline CuPc rectangular NTs have a relatively higher photosensitive current than the self-assembled α-phase CuPc NW. From the gate field-dependent *I-V* characteristics for a single NW/NT transistor, improved the charge carrier mobility has been observed in the β-phase CuPc crystalline rectangular NT, compared with the self-assembled α-phase CuPc NW. These results originated from the relatively strong π-π interaction between the CuPc molecules of the β-phase CuPc crystalline rectangular NT. We fabricated organic photovoltaic devices using by the CuPc NW/NT composites with PCBM, and measured the photovoltaic characteristics.