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ABSTRACT BOOK

## **Photo-responsive and Charge Transport Characteristics of 2-Dimensional Soluble Organic Materials for Thin Film Transistors**

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We fabricated photo-responsive organic thin film transistors (OTFTs) using 2-dimensional soluble organic materials such as star-shaped 4(HP3T)-benzene and X-shaped HB-ant-THT molecules. The photo-responsive current-voltage characteristics were investigated as a function of gate-bias and light power in the 4(HP3T)-benzene based OTFTs. The gate-field dependence of photosensitivity on light power was analyzed through two photocurrent mechanisms caused by photovoltaic and photoconductive effects. To study charge transport mechanism of the active 2-dimensional soluble organic materials in OTFTs, the temperature dependence of 4-probe conductivity and mobility was measured in the OTFTs. We observed that the charge transport mechanism was changed through applied gate bias of the OTFTs. Ambipolar transport and photo-responsive characteristics of OTFTs using 4(HP3T)-benzene and PCBM composites with various concentrations were studied for the photovoltaic effect. The field effect mobility and power conversion efficiency according to concentration of PCBM of the composites were compared.