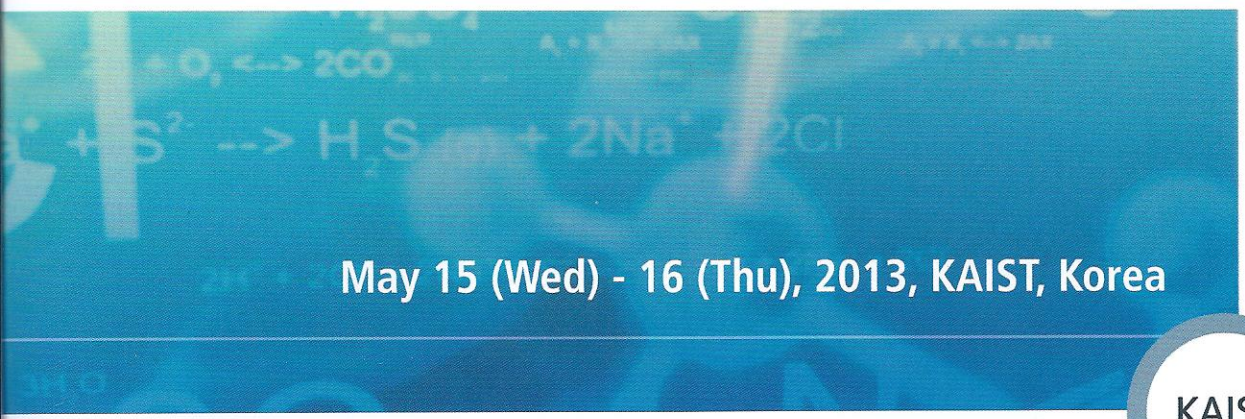
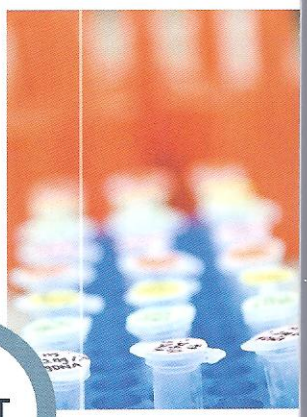
IC ME&D 2013

The 24th International Conference on Molecular Electronics and Devices



May 15 (Wed) - 16 (Thu), 2013, KAIST, Korea



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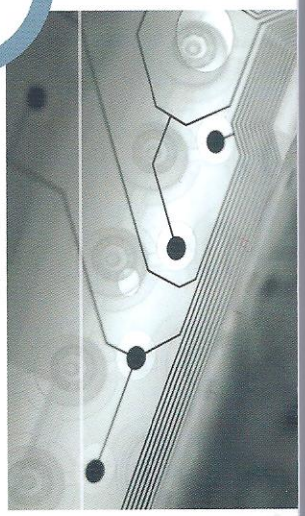

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Optoelectronic Characteristics of Rubrene Nanosheet Based Organic Field Effect Transistor Hybridized with CdSe/ZnS Quantum Dots

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We fabricated OFETs (organic field effect transistors) using rubrene nanosheets (NSs) and single crystals (SCs) hybridized with CdSe/ZnS quantum dots (QDs). Two dimensional rubrene NSs (thickness = 200nm) and SCs (thickness = 50μm) were synthesized by using organic vapor deposition and direct growth methods, respectively. For nanoscale structural and optical properties, atomic force microscopy (AFM) images and laser confocal microscope photoluminescence (LCM PL) spectra were measured. The transistor characteristics of the rubrene NS or SC based OFETs were investigated with and without light irradiation (λ_{ex} = 455nm). To discern the results of hybridization with and without QDs (λ_{em} = 532nm), the output characteristics of the OFETs and LCM PL spectra were compared. The LCM PL spectra of the rubrene NS were changed through the attachment of QDs. The photocurrent of the OFETs using the rubrene NSs was dramatically enhanced by the hybridization with the QDs. The optoelectronic properties of the OFETs were analyzed in terms of the photoresponsive field effect transport of organic thin film semiconductors.