



# ICSM 2010

INTERNATIONAL CONFERENCE ON  
SCIENCE AND TECHNOLOGY OF  
SYNTHETIC METALS 2010

KYOTO, JAPAN

JULY 4-9, 2010

ABSTRACT BOOK

**Fabrication and Photo-responsive Characteristics of  
Hybrid Nanotubes/Nanowires  
using  $\pi$ -Conjugated Organic Materials**

K. Kim<sup>1</sup>, J. W. Shin<sup>1</sup>, H. -S. Noh<sup>1</sup>, J. W. Lee<sup>1</sup>, Y. B. Lee<sup>1</sup>,  
M. Y. Cho<sup>1</sup>, S. H. Lee<sup>1</sup>, D. H. Park<sup>1</sup>, D. K. Jang<sup>2</sup>, C. J. Lee<sup>2</sup>, and  
J. Joo<sup>1</sup>

<sup>1</sup>Department of Physics, Korea University, Seoul 136-713, Korea,  
e-mail: jjoo@korea.ac.kr,

<sup>2</sup>School of Electrical Engineering and Department of Micro/Nano  
Systems, Korea University, Seoul 136-713, Korea

We fabricated  $\pi$ -conjugated organic materials-based hybrid nanotubes/nanowires (NTs/NWs) such as coaxial NTs of multiwalled carbon nanotubes (MWCNTs) coated with light-emitting poly (3-hexylthiophene) (P3HT) and composite NWs of P3HT and [6,6]-phenyl-C<sub>61</sub>-butyric acid methyl ester (PCBM). The P3HT/MWCNT coaxial NTs were fabricated through electrochemical polymerization of 3-HT monomer onto the surface of the MWCNT. The P3HT/PCBM composite NWs were fabricated through wetting process based on Al<sub>2</sub>O<sub>3</sub> template. The formation of the hybrid NTs/NWs was visually confirmed by SEM and TEM images. The optical and structural properties of the hybrid nanosystems were characterized using UV/Vis, Raman, FT-IR, and photoluminescence spectra. The photo-responsive current-voltage characteristics were measured for the single strand of the hybrid NTs/NWs. We discuss photo-responsive charge transport characteristics including a photovoltaic effect for the single strand of the hybrid nanosystems.