

제 6회 한·스웨덴한림원 공동심포지엄

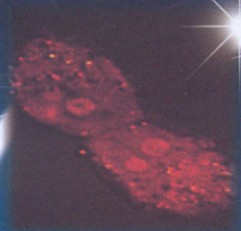
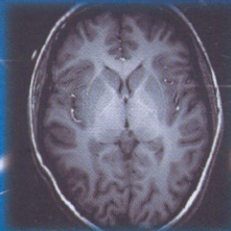
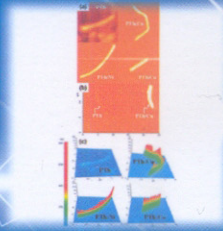
The 6th KAST-KVA Bilateral Symposium

나노와 나노바이오 융합 과학과 기술

Nano- and Bionano- Science and Technology

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Speaker



Jinsoo Joo

Professor

Department of Physics, Korea University

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Major Activities

- 1994** Ph.D., Department of Physics, The Ohio State University, U.S.A.
- 1994-1995** Post-doc., Department of Physics, The Ohio State University, U.S.A.
- 1995-1998** Assistant Professor, Department of Physics, Korea University, Korea
- 1999-2004** Associate Professor, Department of Physics, Korea University, Korea
- 2001-2002** Visiting Scholar, Department of Physics, The Ohio State University, U.S.A.
- 2004-Present** Professor, Department of Physics, Korea University, Korea

Honors and Awards

- 1998-1989** University Fellow, The Ohio State University
- 2006-Present** Chaired Professor in Science at Korea University supported by Hyundai-Kia Com.
- 2007-Present** Head of National Research Lab : Hybrid Nanostructure Research

Research Interests

Charge transport of conducting and semiconducting organic materials
 Synthesis, characteristics, and application of organic-based nanomaterials
 Total 124 published papers and more than 20 invited talks

Enhancement of Light Emission of Organic-Inorganic Hybrid Double Layered Nanotubes

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We observed a huge enhancement of photoluminescence (PL) for a single strand of light emitting polymers; polythiophene (PTh) or poly (3-methylthiophene) (P3MT) nanotubes, coated with nanoscale copper (Cu), nickel (Ni), or cobalt (Co) metal; and so called - coaxial organic-inorganic hybrid double layered nanotubes (HDLNTs). For the coaxial HDLNTs, the polymer nanotubes were electrochemically synthesized using an Al₂O₃ nanoporous template. The metals with nanoscale thickness (about 10 nm) were sequentially electrochemically deposited onto the polymer nanotubes. The hybrid nanotubes were visualized and confirmed through scanning electron microscope, transmission electron microscope (TEM), high-resolution (HR)-TEM, and elemental analysis. The enhanced PL efficiency in nanoscale was determined through laser confocal microscope (LCM) PL measurements with a high spatial resolution. The LCM PL intensity of the single strand of the PTh/metal HDLNTs increased up to about 100 times depending on the kinds of nanoscale metals. We also found that the nanoscale LCM PL intensities of P3MT nanotube based-HDLNTs remarkably increased as the doping levels of the P3MT nanotubes increased. We analyze that the huge enhancement of LCM PL of the PTh and P3MT based-HDLNTs might originate both from energy transfer and charge transfer in a surface plasmon resonance (SPR) coupling. From ultraviolet and visible absorption spectra and calculations of local electric field enhancement for the hybrid nanostructures, the SP effects contributed to the enhancement of PL. The SP enhanced PL of organic polymer and inorganic metal hybrid nanotubes could be significantly applied to organic based displays and nanoscale optoelectronics.