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대전컨벤션센터
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EF-05 금 나노입자를 이용한 발광 고분자 나노튜브의 발광 특성 향상 박동혁, 조응희, 김미경, 김미숙, 주진수, 김대철1, 송규현1, 김경용1(고려대학교 물리학과 1선문대학교 물리학과) 금 나노입자를 이용하여 발광 고분자 나노튜브의 발광 특성을 크게 향상시켰다. 발광 고분자 나노튜브는 나노입자를 가지는 다중성 무기 배경 물질을 이용하여 전기화학 중합방법을 통해 polythiophene (PTH)의 고용도성 Полy (3-methylthiophene) (P3MT) 나노튜브를 합성하였다. 금 나노입자는 HAuCl₄·3H₂O 용액에 페어하여 지름이 약 3~5 nm로 형성하였다. 금 나노입자가 응축된 나노튜브의 혼합 여부를 전자스캐닝 현미경(TEM)과 투과 전자 현미경(TEM)과 고분해능 투과 전자 현미경(TEM)을 이용하여 확인하였다. 합성된 나노튜브의 광학적 구조적 특성을 확인하기 위해서 자외선 흡수(UV/Vis absorption), 광발광(PL), X선 빔플래턴(XRD) 실험을 수행하였다. 자기 분석기 원자력 현미경(ADF)과 애러지 광초점 현미경(laser confocal microscope, LCM)을 사용하여 합성된 나노튜브의 광학적 발광 및 랜덤 특성을 관찰하였다. 광발광 특성을 보관한 플라즈마 공명(Surface Plasmon Resonance, SPR)에 의한 현상으로 해석하였다.

EF-06 Modulation of optical properties of single-walled carbon nanotubes by AuCl₃ KIM Ki Knaa, BAE Jung Jun, KIM Soo Min, AN Kay Hyoeok, BAE Dong Jae, LEE Young Hee(Department of Physics, Sungkyunkwan University.) The optical band gap engineering of single-walled carbon nanotubes(SWCNTs) is an important issue for the application optical-nano electronic devices. We have introduced the selectively optical band gap engineering of SWCNTs by AuCl₃. We found that a optical band gap engineering of both metallic and semiconducting nanotubes depends strongly on the concentration of AuCl₃. The electrons near the fermi level of metallic nanotubes were removed initially at low concentration in the Raman spectra, followed by subsequent removal of semiconducting subband E₁₁S and E₂₂S level in UV-Vis-NIR spectrum. With increasing the concentration further, E₁₁M of metallic nanotubes was suppressed. Also, new peak around 1.1 eV in the UV-Vis-NIR spectra were induced by higher doping level. due to the downshifts of Fermi level of SWCNTs. This phenomena was confirmed by the XPS spectra and Raman spectra.

EF-07 A Controlled Synthesis and the Optical Properties of Hybrid InO₃/Ag Nanochains and Nanoparticles: Surfacet Plasmon Resonance and Enhanced Raman Scattering 장재훈1, 정태훈, D.J Min1, 홍승호1(성균관대학교 물리학과 1성균관대학교 성균관대학교 상관과학기술원, 성균관대학교 상관과학기술원 2상관과학기술원) The hybrid InO₃/Ag nanochains and nanoparticles were synthesized by homogeneous reaction of In(NO₃)₃ and AgNO₃ without and/or with Polyvinylpyrrolidin(PVP) in 6 mL of ethylene glycol solution at 230°C for 20 hrs and then annealing at 450°C for 5 hrs was carried out. The compositions of the resultant InO₃/Ag nanochains and nanoparticles were confirmed by X-ray Diffraction (XRD), X-ray Photoemission spectroscopy (XPS) and Energy Dispersive Spectroscopy (EDS), respectively. The morphologies were investigated with Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM) and High Resolution Transmission Electron Microscopy (HRTEM) images. On the basis of our experiments results, the surfactant-induced formation mechanism is proposed to account for their growth processes. And InO₃/Ag nanochains and nanoparticles were shown surface plasmon resonance with the broad absorption bands and nanoparticles exhibit a broad absorption band and enhanced Raman scattering signal due to the formation of the local coulomb field at the interfaces between Indium oxide and silver. Furthermore, InO₃/Ag nanochains show stronger intensity of surface enhanced Raman scattering than that of InO₃/Ag nanoparticles because InO₃/Ag nanochains display the crinkled characteristics, preferably leading to the huge local electrical field. In addition, the calculation was carried out using the density function theory to confirm the variation of the band structure and density of states of hybrid InO₃/Ag in comparison with pure InO₃ compounds.

EF-08 A Technique to Produce Well Conducting and Mechanically Secure MWNT Attached AFM Tips 안상경, 강영호, 최진호, 박병찬, 박민현, 최재용, 류중식(포항공과대학교, 포항공과대학교 포항공과대학교, 포항공과대학교 포항공과대학교) Multiwall carbon nanotube (MWNT) attached atomic force microscope (AFM) tips (MWNT tips) have been demonstrated useful in various applications. One of them is AFM lithography. Good conducting and mechanically well-attached MWNT tips are needed for such application. However producing MWNT tips with these qualities are still technically unsolved problem. Our MWNT tips were produced by hydrocarbon-deposition-attachment and were tested to be mechanically well-attached by stress-testing in a scanning electron microscope. However characterizing the conductance of MWNT tips was nontrivial: Our MWNT tips usually did not make good electrical contacts to gold electrode because of thin and rough amorphous carbon layer on MWNT that was unintentionally deposited during the attachment. We found that good contacts can be made if more amorphous carbon layer is deposited to form thick