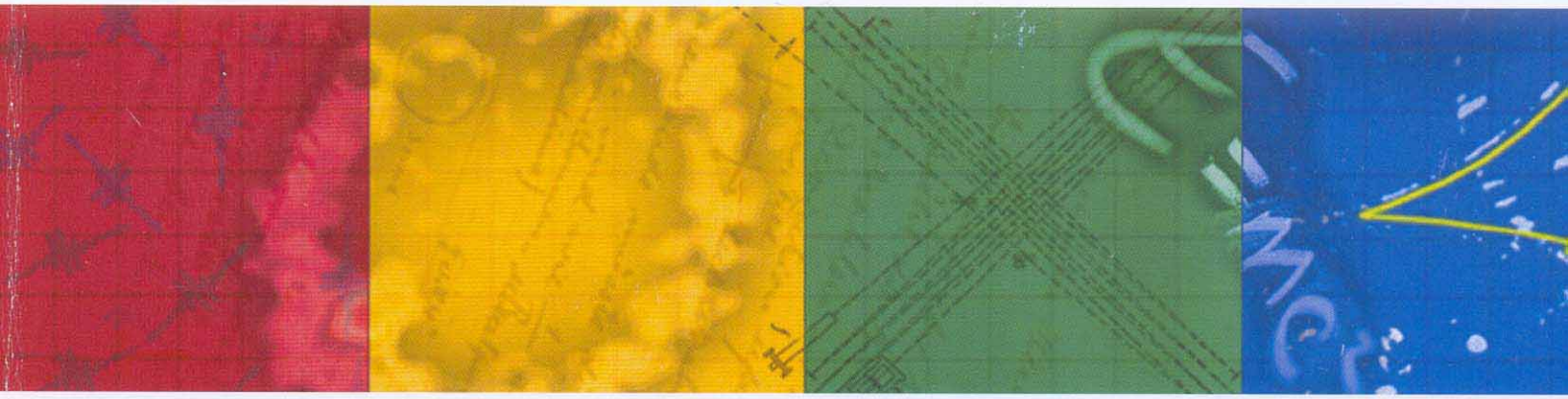
2006년 4월
제24권 제1호

한국물리학회

회보

BULLETIN OF THE KOREAN PHYSICAL SOCIETY



2006년 봄 학술논문발표회 및 제82회 정기총회

휘닉스파크

2006. 4. 20(목)~21(금)

KPS 사단법인 한국물리학회
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they can be used in NIR thermal therapy of tumors and drug delivery. In addition to spectral tunability, biomolecules are easily conjugated to Au nanoshells and it provides the capability of tumor cell targeting.

Ep3-090 **Controlled growth of silicon oxide nanowires on Si substrates using Au and Au-Pd catalysts** 박 현규, 양 비룡, 김 상우, 김 길호[1], 윤 두협[2], 김 상협[2], 김 기출[2], 맹 성렬[2](*금오공과대학교 신소재시스템공학부. [1]성균관대학교 정보통신공학부. [2]한국전자통신연구원.*) In this work, we report amorphous SiOx nanowires directly grown on Si substrates via a solid-liquid-solid formation mechanism. Au-Pd and Au thin films (3 nm) deposited on Si (001) and (111) substrates were used as catalysts for growth of nanowires. High-yield synthesis of SiOx nanowires was simply achieved by heating (1050-1150°C) in an Ar-ambient atmosphere without introducing any additional Si source materials. The grown nanowires were characterized by FE-SEM, EDX, and HR-TEM measurements. Morphology and composition of the amorphous SiOx nanowires with diameters of 10-100 nm and lengths of a few - tens of micrometers could be easily controlled by as a function of growth conditions including substrates, catalysts, heating temperatures, and processing time.

Ep3-091 **Metallization Scheme for Electrical Transport in Self Assembled Large Scale Carbon Nanotube Array** 박 정훈, 이 병양, 홍 승새, 홍 승훈, 박 윤(*서울대학교 물리학부.*) We report on an investigation of various metallization schemes to self assembled large scale carbon nanotube arrays. Reliable and robust metallization scheme to realize ohmic contacts to single wall carbon nanotubes (swCNT) by metallic thin films is an important technological step for the realization of swCNT-based nanoelectronics and their applications. Although electrical contacts to individual swCNT by Cr, Ti and Pd have enabled observations of ballistic electron transport in swCNTs, a systematic study of metallization and the resulting electrical properties for self assembled large scale CNT array has been limited. Self assembled large scale CNT arrays have technological advantages for mass-production of swCNT-based devices. Large scale CNT arrays are selectively patterned by self-assembly on areas defined by lithographic methods. Metallization and electrical properties of resulting contacts are studied by patterning submicron contact areas to 2 mm wide CNT array elements by e-beam lithography followed by e-beam evaporation of potential contact metals. We will report on the resulting electrical properties of the contacts from utilizing differing materials and annealing conditions.

*This work is partly supported by KOSEF and Samsung Electronics Endowment through CSCMR and MOCIE. SH acknowledges the support from TND program.

†parkyd@phya.snu.ac.kr

Ep3-092 **Photocurrent of CNT-incorporated polymer** 유 세기, 김 진영, 이 형숙, 허 정나[1], 정 태원[1], 이 정희[1], 진 용완[1], 김 종민[1](*한국외국어대학교 물리학과. [1]삼성종합기술원 전자방출원연구단.*) Photoemission current of carbon-nanotubes-(CNTs)--incorporated polymer was observed. Single-walled CNTs were dispersed on the substrate, or CNT paste was printed on the substrate. On CNTs polymers were spin-coated and dried in the vacuum furnace. The sample was positioned on the vacuum chamber, and photoemission current was measured using visible light. Photoemission current of polymer-CNTs was greatly enhanced for the case of the single component, i.e., CNT only. The underlying mechanism for this amplification of photoemission will be explained in the poster.

Ep3-093 **Photoluminescence of light emitting polythiophene and its derivatives nanotubes** 조 미연, 박 동혁, 주 진수(*고려대학교 물리학과.*) π-공액 구조를 갖는 polythiophene (PT) 나노튜브와 그 유도체인 poly (3-methylthiophene) (P3MT) 나노튜브를 나노기공 템플레이트인 Al_2O_3를 사용하여 전기화학적 중합방법으로 합성하였고, photoluminescence (PL)를 관찰하였다. PT와 P3MT 나노튜브는 SEM과 TEM 사진으로부터 직경 100~200 nm, 두께 10 nm, 길이 ~40 μm인 나노튜브 형태로 합성되었음을 확인하였다. PT와 P3MT 나노튜브 중합 시 사용되는 도펀트 ($TBAPF_6$, $TBABF_4$, CSA, DBSA)와 합성온도, 나노기공 템플레이트를 녹이는 용매 (HF 혹은 NaOH)를 달리하여 π-π* 천이, 바이폴라론 봉우리 등 물리적 특성을 조절하였다. 도핑 정도가 높은 나노튜브의 PL 봉우리가 청색 천이 현상을 보이는 등, 도핑 정도에 따라 나노튜브의 PL 크기 변화를 관찰하였다.

Ep3-094 전기 화학적으로 합성되어 O_2 플라즈마 처리된 니켈 나노와이어의 전계방출 특성 연구 이 선정, 박 동혁, 김 현승, 주 진수, 이 철진[1], 이 연희[2], 김

영수[3], 이 성래[4], 정 승일[5](*고려대학교, 물리학과. [1]고려대학교, 전자공학과. [2]한국과학기술연구원. [3]고려대학교, 화학과. [4]고려대학교, 신소재공학과. [5]한양대학교, 나노공학과.*) Al_2O_3나노기공을 이용하여 강자성체인 니켈(Ni) 나노와이어를 전기화학적 방법으로 합성하였다. 합성된 Ni 나노와이어와 이 Ni 나노와이어에 O_2 플라즈마 처리 한 것을 각각 나노팁으로 이용하여 전계방출 실험을 수행하였고, 그 결과의 차이를 비교 하였다. SEM, XRD 실험을 통해서 Ni 나노와이어 합성을 확인하였고, HR-TEM과 전기 전도도 온도 의존성 실험을 통하여 O_2 플라즈마 전과 후의 전기적 특성을 비교하였다. SDC(solution drop casting) 방법으로 Ni 나노와이어 전계방출 어레이를 만들어 전계방출 특성을 조사하였다. O_2 플라즈마처리 한 Ni 나노와이어는 turn-on 전압이 4 V/μm 로 다른 금속 나노와이어 보다 비교적 낮은 turn-on 전압을 갖는 특성을 보였다. 또한 Fowler-Nordheim 모델을 이용하여 얻은 field enhancement factor (β) 값이 4013이었다. 이것은 CNT를 이용한 전계 방출 특성과 거의 비슷한 결과를 가지고 있는 것을 확인하였다.

Ep3-095 **Encapsulation of CdSe nano particles in liposome** 성진 김, 행섭 위, 기범 김, 혁규 박, 상민 김, 호순 양(*부산대학교 물리학과.*) We studied the encapsulation of CdSe nano-particles inside liposomes suspended in aqueous solution. Mixed solution of CdSe nano-particles and Asolectin lipid molecules was dried and hydrated with PBS buffer solution. And we observed large liposomes with CdSe nano-particles, which exist in two different states. One is that nano-particles exist as micelle state inside liposome. The other is that nano-particles are locally encapsulated in the lipid bilayer of liposome. To our knowledge, the encapsulation of CdSe nano-particles in lipid bilayer of liposome has never been reported before.

Ep3-096 **Photo-excitation cross section of Er:SNS system fabricated by ion implantation** 김 준곤, 최 한우, 우 형주, 김 기동, 홍 완, 박 중헌, 이 화련(*한국지질자원연구원.*) 이온주입방법만으로 실리콘나노구조물과 어븀(Er)을 주입하여 Er:SNS(silicon nano-structure) 시스템을 제작하고 그것의 광-발광 효율을 평가하였다. SRIM 2003을 사용하여 실리콘산화물 내부에 실리콘과 Er원소를 겹치도록 설계하였다. 실리콘 이온주입 후 고온 열처리하여 나노미터 크기의 실리콘 알갱이를 형성하고 연달아 Er이온을 주입하여 저온열처리 과정으로 이온주입된 Er을 활성화하였다. SIMS, RBS, TEM 등의 방법으로 Er:SNS 구조를 분석하였으며 Ar 이온레이저로 여기 광원으로 사용하여 광-발광(photo-luminescence) 특성을 평가하였다. Er:SNS 시스켐의 광-발광 과정은 실리콘나노구조물을 매개로하여 효과적으로 Er을 여기시켰다. 여기광원의 출력에 따른 Er의 적외선 신호를 측정하여 짜 맞추기한 결과 Er:SNS 시스템의 광-여기 반응단면적은 실리콘산화매질의 그것에 비하여 100배 이상 큰 값을 얻었다.

Ep3-097 **High-Yield Synthesis of Polyhedral and Polygonal Au Nanostructures Via A Chemical-Polyol Interdependent Route** LI Cuncheng, CHO Sung Oh(*Korea Advanced Institute of Science and Technology.*) Polyhedral and polygonal Au nanostructures (disks, truncated hexahedra, truncated tetrahedra, octahedral, decahedra and dodecahedra) were successfully synthesized via a simple and low-cost chemical-polyol interdependent route with the assistant of polyethylene glycol (PEG) and surfactant PVP. Briefly, a small amount of sodium borohydride as reducing reagent was added to the PEG solution containing surfactant polyvinylpyrrolidone(PVP), followed dropping $HAuCl_4$ aqueous solution. The as-prepared precursor was aged firstly at a low temperature (T<100 °C), and then was heated at a higher temperature (T>100 °C). Based on this route, Au nanostructures with different shapes were easily obtained. The products are always the mixtures of different shaped Au nanostructures, but their content and size can be manipulated by the experimental parameters, such as the concentrations of precursor (PVP, $HAuCl_4$, $NaBH_4$), the aging or heating temperature. Structural characterization by TEM, HRTEM, SAED and XRD indicated that the surfaces of these Au nanostructures are mainly bound by {111} planes not only for single-crystal Au nanodisks with triangular or hexagonal shape, but also for single-crystal polyhedral Au nanostructures (octahedra, truncated hexahedra, truncated tetrahedra) and multi-twinned decahedral and dodecahedral nanoparticles. Our studies indicate that the surfactant PVP introduced as a stabilizer are crucial for the formation of such nanostructures. Formation of such nanostructures is attributed to the preferential adsorption of some species of molecules in the solution on the {111} planes of Au nuclei, which influence the growth rate of different crystalline planes, leading to the formation of different shaped Au nanostructures with the {111} planes as the basal surfaces. These gold nanostructures, with unique optical properties and well-defined geometrical shapes, could practically