in the application of electronic devices. Among several types of electronic devices much attention has been paid recently to the use of electrically bistable resistive switching organic materials in the fabrication of memory devices. The development of highly stable memory devices based on dimensionally and thermally stable polyimides have been reported so far. Recently, spiropyran moieties containing polymers as a side chain have been used for switching memory effect in polymer memory devices because spiropyran molecule is a well-known photochromic units which undergo reversible structural transformation among multistates in response to external inputs such as light. In this study, we synthesized polyimide containing spiropyran moiety as a side chain, investigated switchable polymer memory characteristics by light

1PS-181 김지수

Electro-Optic Quinolinium Single Crystals for THz Wave Technology

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높은 전기광학 성질을 가지는 퀴놀리늄 유도체를 합성하고, 이의 단결정을 이용한 THz파 발생실험을 수행하였다. 이 중 HMQ-T 결정 (2-(4-hydroxy-3-methoxystyryl)-1-methylquinolinium 4-methylbenzenesulfonate은 배향적도가 $\cos^2\theta_p$=0.92 로 1.0에 매우 근접하여, 높은 비선형적 특성을 보인다. 이는 기존의 THz파 광원으로 주로 사용이 되어진 DAST 결정이나 OH1 결정과 비교하였을 때 비슷하거나 큰 발생 효율을 나타냈다. HMQ-T 결정은 메탄올 포화 용액 제조 후 Slow Cooling 방법을 이용하여 결정을 성장시켰으며 결정구조는 Monoclinic Pn(m) 구조이다. HMQ-T 결정은 836nm 파장에서 OH1 결정과 ZnTe 결정보다 높은 THz효율을 나타낸다.

1PS-182 김철영

Synthesis and characterization of a poly(naphthodithiophene) derivative for organic thin film transistor

김철영, 추아현, 강 일, 권순기, 김윤희[†] 경상대학교

Solution processed Organic thin film transistors (OTFTs) based on polymeric semiconductors as an active layer have attracted wide attention due to their potential use in low-cost, lightweight and flexible electronic devices. Due to the high stability of conducting polythiophenes, extensive efforts have targeted new thiophene architectures that allow for enhanced materials properties, easier processing, and higher stability. . In this study, we designed a p-type thiophene based copolymer containing alkoxy group with polycyclic aromatics to enhance π-conjugation. a poly(naphthodithiophene) derivative was synthesized by Stille coupling reaction.

가공 / 복합재료 (I)

because one cannot evaluate the degree of branching of as-polymerized PPS. Recently, we found that partially sulfonated PPS without significant molecular reduction can be dissolved in deuterated dimethyl sulfoxide up to 2 wt.-% at room temperature. Now this enables us to measure ^{1}H-NMR and ^{13}C-NMR spectra of PPS, from which we can assess the degree of branching of not only as-polymerized PPS, but also PPS used for fiber and engineering plastic production. More details will be discussed in the presentation. **Acknowledgement**: This work was supported by the Industrial Strategic Technology Development Program (No.10033474) funded by MKE, Korea.

1PS-186 강경남

디스플레이용 epoxy composite 기판의 바인더 굴절률에 따른 광학특성제어 대한 연구

강경남, 전현애[†], 탁상용, 김윤주, 박수진, 박숙연, 이학준[1] 한국생산기술연구원: [1]한양대학교

플렉시블 디스플레이 산업에 사용되는 플라스틱 기판의 경우 400~800nm의 가시광선 영역에서 투명해야 하며 색을 띄지 않는 광학적 특성을 가져야 한다. 하지만 유리가 아닌 플라스틱 기판의 내열특성을 확보하기 위한 방안으로, 고분자와 유리섬유와의 복합시스템을 사용하게 되는데, 이로 인해 기판의 광학적 특성에 영향을 주게 된다. 따라서 기판 바인더 소재의 굴절률이 유리섬유 복합체 필름의 광학특성 (투명성, haze, color)에 미치는 영향을 평가하여, 바인더에 요구되는 최적 굴절율 특성을 확보하기 위하여, 연구에서는 각기 다른 굴절률을 가진 에폭시 resin을 이용하여 에폭시-유리섬유 복합체 기판을 제조하고 광학특성을 평가하였다.

1PS-187 강동진

Creating Opal Templated Continuous Conducting Polymer Films with Ultralow Percolation Thresholds Using Thermally Stable Nanoparticles

강동진, 권태균, 김민수, 김범준[†] KAIST

We propose a novel and robust strategy for creating continuous conducting polymer films with ultralow percolation thresholds using polymer-coated gold nanoparticles (Au NPs) and various aspect ratios of CuPt nanorods as surfactants. Continuous poly (triphenylamine) (PTPA) films of high internal phase polymeric emulsions were fabricated using an assembly of crosslinked polystyrene (PS) colloidal particles as template. Polymer-coated NPs were designed to be thermally stable even above 200 ℃ and neutral to both the PS and PTPA phases. Therefore, the NPs localize at the PS/PTPA interface and function as surfactant to efficiently produce a continuous conducting PTPA polymer film with very low percolation thresholds. Morphological studies clearly demonstrated the formation of a continuous PTPA phase within the polyhedral phase of PS colloids.

1PS-188 강민수

Solution-processed Graphene Film Using Polymer Surfactant

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Graphene, a new material with two-dimensional nanostructure consisting of a single layer of sp2 network of carbon atoms, has demonstrated unique properties, such as low resistivity, high chemical stability, and excellent mechanical strength. However, it is difficult to fabricate graphene film through a solution process using organic solvent, and thus critically limits practical applications. In this study, we report a new method to fabricate graphene film using a new polymer surfactant to disperse homogeneously graphene sheets in ethanol. The polymer surfactant consists of oligothiophene, which is strongly adsorbed onto the graphene surface, and polyethylene glycol, which interacts with ethanol. Graphene films of 2 inches diameter were prepared by vacuum filtration. The solubility and electrical resistivity of graphene films were measured by 4-probe point and UV-vis spectroscopy, respectively.

1PS-189 강원영

Supramolecular complexes of single walled carbon nanotubes with sidechain-tailored poly(p-phenyleneethynylene)s

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Poly(p-phenyleneethynylene)s (PPEs), made up of rigid backbone with alternating arylenes and ethynylenes, exhibit high conductivity and chemical stability, and thus they have huge potentials for various applications, including chemosensors, electronic and photonic devices. According to recent reports, PPEs effectively bind to single-walled carbon nanotubes (SWNTs) through π-π interactions, revealing a well-defined morphology of SWNT-semiconducting polymer composites. In this presentation, we present the synthesis of two sidechain-tailored PPEs, poly(ethylene oxide)-grafted PPEs and cyclodextrin-encapsulated PPEs. We also prepare the supramolecular composites of SWNTs with these conjugated polymers, both of which are found to interact with the nanotube sidewalls in a parallel mode and play a role in assembling a superstructure of SWNTs. Various characterization techniques successfully characterize their spectral and morphological properties.

1PS-190 고성록

Fabrication of highly conductive bipolar plate using long carbon fiber technology

고성록, 조영민[1], 김세훈[1,†] 호남석유화학 대덕연구소: [1]호남석유화학

The development trend of bipolar plates at fuel cell has moved from graphite plates toward carbon composites owing to the various merits: light weight, wide process window, low cost, and fast manufacturing process. Generally, bipolar plates using carbon composites are composed of polymer matrix, graphite, carbon fiber, and some additives such as CNT, carbon black, PVDF, etc. Carbon fiber plays the important roles of mechanical reinforcement and electrical conductivity at bipolar plates. Compared with short carbon fiber (chopped carbon fiber), resin-coated long carbon fiber can show versatile advantages: high mechanical strength and high electrical conductivity at low contents. Fuel cell using bipolar plate with 15% resin-coated long carbon fibers revealed the high flexural strength of 74Mpa and high electrical conductivity of 123S/cm, which resulted in the improved current density of 50%, compared with that of 36MPa in flexural strength and 3S/cm in electrical conductivity.

1PS-191 고일웅

Synthesis and characterization of Nanocomposite Involving Multiwall Carbon Nanotube and Polymer with POSS moieties

고일웅, 이종희, 민유라, 임정혁, 김경민[†] 충주대학교

Recently, polymer/CNTs composites have attracted considerable attention because the individual properties of the two components can be combined to give novel hybrid nanomaterials with good mechanical strength, unique multifunctional properties, and excellent processability. In this work, we synthesize nanocomposite of multiwall carbon nanotube(MWNT) and polymer with polyhedral oligomeric silsesquioxane(POSS) moieties through the surface-initiating polymerization of POSS macromonomer from the MWNT modified with atom transfer radical polymerization (ATRP) initiating group. The functionalization of ATRP initiating groups on MWNT was performed through the addition reaction between the initiations of ATRP and MWNT. The nanocomposites were thoroughly characterized by FT-IR, SEM, EDX, TGA and DSC analysis. This research was supported by a grant from the Academic Research Program of Chungju National University in 2011.

1PS-192 고정아

전기방사공정을 이용한 약물전달체의 제조 및 특성연구

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poly(2-pyrrolidone)은 생분해성 고분자로 널리 알려져 있으며, 이로 인해 체내에 주입하는 약물을 효율적으로 전달하기 위한 전달체의 재료로 사용될 수 있다. 한편, 동심원성 이중노즐을 이용한 전기방사는 방사성이 결여된 물질의 방사가 가능하다는 점과 동심원 바깥쪽 물질이 encapsulation 역할을 함에 따라 동심원 안쪽의 물질이 보호되는 장점이 있어서 각광받고 있다. 이번 연구에서는, 생체 내에서 분해가능한 고분자인 poly(2-pyrrolidone)과 수용성 고분자로 알려진 poly(ethylene oxide)를 지지체로 하여, 항생제인 tetracycline의 전달을 위한 약물전달체를 제조하고 특성을 조사하였다. poly(2-pyrrolidone)을 동심원성 이중노즐의 바깥쪽에 주입하고 PEO와 tetracycline을 안쪽에 주입하여 방사한 후 이 섬유의 형태를 전자현미경을 통해 관찰하였으며, 약물전달거동을 UV-Vis Spectra를 이용하여 살펴보았다.

1PS-193 고현석

Characterization of Inverted Polymer Solar Cells with Electrochemical and Adhesion Properties of PEDOT:PSS

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The inverted organic solar cells is fabricated with deposited on top of the active layer on high air-stability hole transfer layer(HTL). It was consisted that ZnO as semiconductor oxide meterial was inserted the inverted organic solar cell by electron injection layer(EIL). To improve the problem of the optical stability between electrodes and organic thin film that smoothly bring the charge injection as well as increase the efficiency of the inverted structure using the organic material, itself. This study on HTL is used as the PEDOT: