여러 가지 기능성 Polysilsesquioxane입자의 제조 및 응용
자외선차단제 및 생체물질 분석

저자
(Authors)

김영백

출처
(Source)

한국고분자학회 학술대회 연구논문 초록집 , 2010.10, 11-11(1 pages)

발행처
(Publisher)

한국고분자학회
The Polymer Society Of Korea

URL

http://www.dbpia.co.kr/journal/articleDetail?nodeId=NODE06262375

APA Style

김영백 (2010). 여러 가지 기능성 Polysilsesquioxane입자의 제조 및 응용. 한국고분자학회 학술대회 연구논문 초록집, 11-11

can be used to control the spatial location of metal precursors and nanoparticles. A highly ordered polystyrene-block-poly(2-vinylpyridine) (PS-*b*-P2VP) micellar array was obtained by solvent annealing. Subsequent immersion of the films in a preferential solvent for the minor component block caused a reorganization of the film to generate a porous structure upon drying. When such reconstructed films were subjected to external stimuli, like solvent vapor or heat, the initial morphology was recovered. These reversible BCP templates were used to control the placement such that, subsequently, oxygen plasma treatment led to the precise placement of metal nanoparticles in a film. By controlling the concentration of the metal precursor solutions, the sizes of nanopartices could be tuned.

한중탁 2L1-4

Nanocarbon-induced rapid transformation of polymer surfaces into superhydrophobic surfaces

한중탁, 김준석, 김성훈, 정희진, 정승열, 이건웅† *한국전기연구원*

We present a facile method to fabricate the superhydrophobic polymer surfaces by solubility modulation and nanocarbon (NC)-induced crystallization of polycarbonate (PC). This method consists of dipping polymer sheet in partially soluble solvent and coagulation in nonsolvent for several seconds. As nucleation agent in solution crystallization of PC, single-walled carbon nanotubes (SWNTs), multi-walled carbon nanotubes (MWNTs) and graphene sheets were used. The crystalline micro- and nano-structure was rapidly formed by dipping PC sheets in solution containing NCs, followed by immersing in IPA. That structures were dependent on the dimension of NCs. Especially, in MWNT solution, dipping for ten second was enough to create the superhydrophobic surface. The crystallization of PC and incorporation of NCs during this process was demonstrated by Raman spectroscope measurement.

구완핑 2L1-5

A Versatile pH-Responsive Supramolecular Nanovalve Based on Monodisperse Hollow Nanospheres Prepared via Polystyrene Latex-Surfactant Dual Templating

구완핑, 박성수, 하창식† *부산대학교*

Supramolecular chemistry is a powerful methodology for the construction of various molecular devices such as molecular shuttles, molecular motors, and nanovalves. Herein we reported a versatile pH-responsive supramolecular nanovalve designed by using mesoporous organosilica hollow nanospheres as nanocontainers. The monodisperse hollow nanospheres have been successfully prepared by using polystyrene latex and cetyltrimethylammonium bromide surfactant as the co-template. The nanovalve is capable of operating in aqueous media and storing guest molecules such as rhodamine B within the hollow core and mesopore shell and releasing them on demand by acid/base triggering of the capping molecules including β-cyclodextrin, dibenzo-24-crown-8, and cucurbit[6]uril, demonstrating a smart vehicle for controlled release.

박인선 2L1-6

Spontaneous and specific activation of chemical bonds in macromolecular fluids

박인선, 김중현† *연세대학교 화공생명공학과*

Mechanical activation of chemical bonds typically involves the application of external forces which implies a broad distribution of bond tensions. We demonstrate that controlling the flow profile of a macromolecular fluid generates and delineates mechanical force concentration enabling a hierarchical activation of chemical bonds on different length scales from the macroscopic to the molecular. Bond tension is spontaneously generated within brush-like macromolecules as they spread on a solid substrate. The molecular architecture creates an uneven distribution of tension in the covalent bonds, leading to spatially-controlled bond scission. By controlling the flow rate and the gradient of the film pressure, one can sever the flowing macromolecules with knife-like precision. Specific chemical bonds are activated within distinct macromolecules located in a defined area of a thin film.

고문주 2L1-7

From Helical Polyacetylene to Helical Graphite

고문주†, Kazuo Akagi *Kyoto University 고분자화학과*

In this work, we present current progress toward the synthesis of helical conjugated polymers using a chiral nematic liquid crystal reaction field as an asymmetric polymerization solvent. Here we focus on hierarchically-controlled helical polyacetylene, which was recently put forward. The hierarchical helical structures (*i.e.*, screw direction of the polyacetylene chain, fibril bundle, and spiral morphology) are rigorously controlled by changing the screw degree or direction of the chiral nematic liquid crystal reaction field. In addition, we show a novel preparation of helical carbon and graphite films from iodine-doped helical polyacetylene through a carbonization process. Carbonization of helical polyacetylene films, via iodine doping, was found to yield carbon and graphitic films that completely preserved morphologies and even helical nanofibril structures.

김영백 2L1-8

여러 가지 기능성 Polysilsesquioxane입자의 제조 및 응용: 자외선차단제 및 생체물질 분석

김영백† *배재대학교*

Polysilsesquioxane (PSQ)은 1950년대 Dow-Corning을 탄생 시킨 물질이다. 짧지않은 역사를 가지고 있으나, 한두가지 경우를 제외하고 PSQ만으로 제조된 물질을 찾아보기는 힘들다. 본 연구는 PSQ 중에서 화학적, 물리적, 기계적, 광학적 기능을 가진 입자에 대한 것으로, 주로 자외선 차단제로의 응용, 형광물질로의 응용, 광거동성물질로의 응용에 대한 것이다. 본 연구에서는 기존 자외선 차단제의 여러가지 문제를 상당히 제거하면서도 비교적 우수한 안정성을 가진 입자를 개발하였으며, 화학기능과 형광을 가진 입자를 개발하여 DNA를 비롯한 생체 물질이 분석에 적용할 수 있음을 밝혀 내었다. 한편, 여러가지 형광물질을 함유한 입자의 현미경적 영역에서의 기계적 움직임에 대한 흥미로운 발견도 본 발표에서 언급될 것이다. 본 연구 결과는 향후 PSQ를 사용한 기능성 물질의 제조 및 적용에 대한 여러 가지 가능성을 제시할 것이다.

분자전자소재 및 소자(분자전자 부문위원회)(II) (제2회장 [10월 8일(금)])

권순기 2L2-1

Development of Organic Photovoltaic Materials

권순기†, 김윤희 *경상대학교*

Soluble conjugated organic materials have received considerable attention because they can be processed in simpler and more cost-effective ways than inorganic semiconductor counterparts. Their electronic and optical properties can be tuned via molecular design and synthesis. In semiconductors, the energy levels of an organic semiconductor govern the efficiency of carrier injection and extraction, control the energy and electron transfer process at the heterojunction, and determine the intrinsic photophysical properties, such as absorption and emission. The opto-electronic properties of conjugated polymers can be effectively tuned by intramolecular charge transfer involving donor-acceptor interactions. The hybrization of HOMO located on the donor moiety with LUMO located on the acceptor moiety provides a means for tunning the electronic and optoelectronic properties in device applications, such as light emitting diodes, photovoltaic cells, field effect transistors, and memory devices.

조길원 2L2-2

Vertically Segregated Photovoltaic Layers :Three-Dimensional Morphology, Charge Transport and Device Performance

조길원† *포항공과대학교*

Due to the poor carrier mobility and high recombination probability of randomly mixed organic semiconductors in photoactive layers, it is still difficult to obtain maximum efficiency of bulk heterojunction organic solar cells. Photoactive layers having vertical composition gradient can improve photocurrent by enhancing carrier mobility and reducing charge recombination. Here we are going to present photovoltaic layers having vertical composition gradient using organic semiconducting nanowires which have high carrier mobility and light absorption efficiency. Three-dimensional morphology, anisotropic carrier mobilities and device performances of vertically segregated photovoltaic layers will be discussed.

박종혁 2L2-3

Introduction of several nanoconcepts for efficient organic photovoltaic devices

박종혁†, 박오옥[1], 왕동환[1] *성균관대학교; [1]한국과학기술원*

The development of new types of energy generation devices is promoted by increasing public awareness that the Earth's oil reserves could run out during this century. As the energy needs of the planet are likely to double within the next 50 years, the stage is set for a major energy shortage, unless renewable energy can cover the substantial deficit left by fossil fuels. Our group has developed new methods to increase light harvesting efficiency to generate electricity and hydrogen production from solar light by applying nano-concepts to materials and/or devices. Some of these approaches could be used as to form nanostructured active materials or devices for organic photovoltaic devices (OPVs), dye-sensitized solar cells and photoelectrochemical cells. In this seminar, the unique materials and processes for