1PS-89 권난현

A facile synthesis of anatase TiO_2 nanoparticles using functionalized PEO-based materials as polymeric stabilizers

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Recently photodynamic therapy (PDT) as an alternative treatment for cancer therapy has received a great attention in the biomedical field. For the photodynamic therapy, a photosensitizer with TiO_2, gold or ZnO as a photocatalyst should be used. In this study, the results for synthesis and the characterization of new water-soluble anatase TiO_2 nanoparticles stabilized by PEO-based polymers are reported. Nano-sized TiO_2 was prepared by a conventional process such as in aqueous media or organic solvents. New water-soluble TiO_2 nanoparticles using both PEO-folate conjugate and PEO-*b*-PMAc as stabilizers exhibiting anatase crystalline structures were successfully synthesized in ethanol. The resulting nanocrystalline TiO_2 showed anatase crystal structure (10nm or less) on the basis of the characterization XRD, TGA, TEM, and ED-pattern analysis. Its photo-catalytic activity was evaluated on the degradation of methylene blue (MB).

1PS-90 권영은

Adhesive Performance and Electrical Properties of Acrylic Pressure Sensitive adhesive using Salts

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An electro-optic display comprises first and second substrates, an adhesive layer and a layer of electro-optic materials disposed between the first and second substrates. The electrical conductivity of polymers can be increased by promoting the movement of electrons or ions. The effect of the blending of lithium salts on the electrical and mechanical properties of acrylic pressure sensitive adhesives was investigated. The salts affected the chemical microstructures and consequently the mechanical properties of adhesive layer. Lithium chloride was able to create a motion of the ions Li+ and Cl- along the polyacrylic chains, because LiCl was completely dissociated.

1PS-91 권혁중

Synthesis of Silica-γ-MPS on polymer electrolyte membrane from sulfonation of copolymer of alpha methyl styrene and acrylonitrile (α-SAN) for direct methanol fuel cell (DMFC)

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DMFC has many strong points such as volume energy density, stability of fuel storage and easy transportation. For the reason why methanol is supplied at anode ditectly, it has not only simple system of fuel supply but whole system device like portable small power supply device. Moreover, it is one of the fuel cells which are eco-friendly. The important part of DMFCs is the polymer electrolyte membrane. These days, it is Nafion that is used very universally. Though Nafion has excellent conductivity, it has a little expensive. So, this study shows that it is made by copolymerization of the alpha methyl styrene more oxidatively stable than polystyrene and the acrylonitrile which has mechanical and chemical stability. Afterwards, polymer copolymerized is sulfonated in order to improve the conductivity. In addition, by using the silane coupling agent, it is expected to have higher conductivity than Nafion at the polymer electrolyte membrane

1PS-92 권희정

Radiation synthesis of PLGA particles and their application to filtration system

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Recently, transfusion by component blood products instead of whole blood has gradually increased. The blood transfusions are associated with deleterious effects caused by residual leukocytes in blood and blood components. In this study, PLGA particles were synthesized for filtering a specific blood component by using radiation. The optimal condition to filter the blood components was investigated by controlling properties of filters such as composition, surface charge, and the filtration method. This study suggests the new devices dedicated to the filtration of blood products.

1PS-93 길은경

Grafting of peptides on a magnetic nanoparticle for pH sensor

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Surface-grafted polypeptides have drawn considerable attention in recent years because of their distinct ordered secondary structures. The ordered structures offer unique thin film properties. For example, the grafted poly(γ-benzyl L-glutamate), poly(N- carbobenzyloxy-L-lysine) thin films on solid substrates demonstrated high electro optical and piezoelectric efficiency, as a result of the presence of net dipole moment in the films. The grafted poly(L-glutamic acid), poly(L-lysine) on membranes was employed as a pH-sensitive gating for water permeability because its conformational transition between helix and coil can be modulated by pH. In this study, we attempt to synthesize surface-grafted polypeptide films on Fe2O3 nanoparticles surface. To verify the synthetic results, both DLS and Fourier transform infrared spectroscopy (FTIR) will be used to characterize the film thicknesses, refractive indices, chemical compositions, and secondary structures.

1PS-94 김경태

Synthesis of Two-Dimensional Graphene Nanoribbons in Solution

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Graphene nanoribbons (GNRs) have recently attracted much attention from both academia and industry because GNRs with a width smaller than 10 nm show semiconducting behavior that renders them suitable for active layer materials of electronic devices. Several methods have been reported to produce graphene nanoribbons: patterning, printing and direct laser writing. However, these methods are so uncontrollable and severe to fabricate that the quality of the resulting graphenes is largely restricted and therefore their applications are limited. Hence, it is strongly needed to develop a new method for synthesis of GNPs in mild condition. In this study, GNRs are synthesized from polyphenylene precursor with a unique nonrigid kinked backbone, which is converted into the corresponding polycyclic aromatic hydrocarbon by the Scholl reaction (oxidative cyclodehydrogenation). The synthesized GNRs exhibit ambipolar carrier transport behavior when those are used as active layer of OTFT device.

1PS-95 김기현

Development of Novel Polybezoxazine-Polybenzimidazole Electrolyte membrane for Fuel Cell at Elavated Temperature

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New phosphoric acid-doped cross-linked benzoxazine-benzimidazole copolymer membranes for elevated temperature polymer electrolyte membrane fuel cells (PEMFCs) were fabricated. The cross-linked copolymer membranes were prepared by mixing poly[2,2'-(m-phenylene)-5,5'-bibenzimidazole] (PBI) with 3-phenyl-3,4-dihydro-6-tert-butyl-2H-1,3-benzoxazine (pBUa), followed by subsequent heating to 220 ℃ and even large-sized films could be easily prepared. A cell made of cross-linked membranes exhibited high proton conductivity and long-term durability compared to PBI membranes.

1PS-96 김기홍

Solvent-induced intramolecular energy transfer of pullulan conjugates modified with porphyrin chromophores

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To design an artificial light-harvesting antennae, a pullulan, polysaccharide polymer consisting of maltotriose units, was chemically modified with energy-donating (PZn) and energy-accepting porphyrins (PFB), giving pullulan conjugates. Using the fluorescence emission spectra, the PZn-to-PFB energy transfer property of pullulan conjugates was monitored at different DMF/water ratios, where the efficiency of energy transfer increases along with the content of water. We report on the details of solvent-induced intramolecular energy transfer properties in pullulan conjugates.

1PS-97 김대근

Fluorescent detection of thrombin by formation of insoluble aggregated fibrin with a water-soluble conjugated polymer

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Recently, water-soluble conjugated polymers have received a great deal of attention due to their unique optoelectronic properties, which may serve as a basis for a new generation of optoelectronic devices and biochemical detection. These days, researchers have studied about interaction between thrombin and fibrinogen. This interaction is related to blood coagulation. The thrombin can form the fibrin clot to be interacted with fibrinogen. This fibrin clot is insoluble in water because it forms a gel. Herein to detection of this thrombin, we synthesized a water-soluble conjugated polymer using 4,7-bis(5-bromothiophen-2-yl)benzo-2,1,3-thiadiazole, 1,4-dibromo-2,5bis(4-sulfonatobutoxy benzene sodium salt, and 4,4,5,5-tetramethyl-2-(4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan 2-yl)phen-yl)-1,3,2-dioxaborolane. As a result, we confirmed fluorescence change from blue to red by adding thrombin into the aqueous solution of polymer with fibrinogen.

1PS-98 김도영

기상 불소화 및 실란을 이용한 저표면에너지 고분자막 개질

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본 연구에서는 PET 필름에 trialkoxyalkylsilane과 기상 불소화 처리를 하여 고분자 필름 표면을 물리 및 화학적으로 개질하여 낮은 표면에너지를 가지는 고분자 필름을 제조하였다. 준비된 고분자 필름을 알코올과 암모니아수, Trimethoxy(propyl)silane의 혼합용액으로 딥코팅 하였으며, 상온 0.5 bar에서 질소와 불소의 부분압 조건(F_2 : N_2=1:9)을 다르게 하여 실란계의 불소화 정도를 조절하였다. 제조된 필름의 표면 화학 특성을 분석하기 위해 XPS를 사용하였다. Diiodomethane 및 H_2O에 대한 필름 표면의 접촉각 변화를 측정하고 이를 이용하여 표면에너지를 계산하였다.

1PS-99 김동욱

Antifouling Paint based on Poly(methacrylic acid)-*b*-Polyurethane-*b*-Poly(methacrylic acid) Tri-block Copolymers with Tertiary Amines

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Antifouling paint can be defined as preventing the attachment of organisms onto surfa One of the potential ways to develop the antifouling paint is to coat the immersed sur composed of the ammonium salt-based paints with the self-polishing property. Th paints include tertiary amines as biocides which have effective biocidal and biodegrac properties without accumulation in the sea environment. However, ammonium salt-b coatings are too sensitive to seawater and become swollen befor complete dissolu In this study, poly(methacrylic acid)-b-polyurethane-b-poly(methacrylic acid) tri-b copolymers(TBCs) were synthesized by using hydrophobic polyurethane macroinit in atom transfer radical polymerization(ATRP) of tert-butyl methacrylate. Poly(methac acid) block length was controlled and the thickness of TBCs was measured by laser scan micrometer to confirm the self-polishing property.

1PS-100 김동원

Synergetic Effect of Inorganic Salt and Metal Oxide as Efficient Double Interl Layers for Polymer Solar Cells

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