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연구논문 초록집

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대전컨벤션 센터
3,4- Biomass (3,4-dicarboxybenzenetricarboxylate)-4'-nitrostilbene dihydride (4) was prepared and reacted with the corresponding aromatic diamine to yield unprecedented Y-type polymers 5-8 containing 3,4-dicarboxystilbene groups as NLO-chromophores, which constituted parts of the polymer backbones. The resulting polymers 5-8 are soluble in polar solvents such as DMP and DMSO. Polymers 5-8 showed a thermal stability up to 320 °C in TGA thermograms with $T_d$ values obtained from DSC thermograms in the range 143-164 °C. The second harmonic generation (SHG) coefficients ($d_{22}$) of poled polymer films at the 1064 nm fundamental wavelength were around 9.4±15 x 10$^{-9}$. The dipole alignment exhibited exceptionally high thermal stability even at 30 °C higher than $T_d$, and there was no SHG decay below 190-190 °C because of the partial main chain character of polymer structure, which is acceptable for nonlinear optical device applications.

**Preparation of Polythiophene Based Functional Block Copolymers Through Nitroxide Mediated Polymerization Technique and Their Applications**

**Polymer nano-objects have been studied as functional materials for many cutting-edge applications owing to the combination of good processability of polymer and high functionality of nano-objects. Generally, the surface modifications of the nano-objects are required to ascertain a good dispersion of the objects in solvents and polymer matrices. Well-defined block copolymers having controlled number of functional groups can be used as surface modifiers for these purposes, where the block copolymers can be prepared through controlled polymerization techniques. In this presentation, various polythiophene based functional block copolymers were prepared through living radical polymerization technique, especially nitroxide mediated polymerization technique. The surfaces modifications of various nano-objects were demonstrated with the block copolymers, which resulted in improved dispersion of the nano-objects and better nano-objects properties.**

**Synthesis and Characterization of (Nitrilotriacetic Acid)-End-functionalized Polymers**

**Nitrothiic acid (NFA) is a well-known tetradeutate ligand capable of occupying four positions in coordination sphere of octahedral metals. When NFA is complexed with octahedral metals, such as Ni$^{2+}$, it has strong interaction with a sequence of competitive ligands, e.g. imidazole. Therefore, the introduction of NTA group at the polymer chain end can be an attractive of approach for bio-conjugation of polymers with proteins. In this presentation, I will discuss the preparation, characterization and applications of (nitrilotriacetic acid)-end-functionalized polymers which was prepared via Atom Transfer Radical Polymerization (ATRP).**

**Preparation of Novel Colorless and Transparent Rigid Polyimides with Controlled Molecular Structure by Chlorine Side Group**

**Supramolecular systems have attracted a great deal of attention in recent years because of their challenging construction as well as their potential application in molecular devices. Herein, we designed and synthesized two novel compounds comprising azobenzene unit and butylene unit and their structures were fully characterized by FT-IR, 'H-NMR spectra and Mass spectra. We will use determine whether these two novel compounds could be associated with α-Cycloextrin and whether they have the photocyclcopolymerized supramolecular assembly and disassembly because of the E/Z-photoisomerization of azobenzene unit and the butylene unit under different light wavelengths and show the photoduced conformational changes. It is anticipated that this work will provide a model system that combines photochromism and host-guest chemistry for a stimulus-responsive vehicle.**

**Photo-controlled reversible Supramolecular Assembly of Azobenzene-Containing Compounds with α-Cyclodextrin**

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**Preparation and Characterization of Nafion/Microporous ETS-4 Composite Membranes for Direct Methanol Fuel Cells**

**Direct methanol fuel cells (DMFCs) are suited for portable devices due to their high energy density and the ease of handing of a liquid fuel. Yet they have major drawbacks such as methanol crossover. In this study, in order to decrease the methanol crossover of the membranes for DMFCs, Nafion/Engelhard titanosilicate-4 (ETS-4) composite membranes with ETS-4 contents of 5, 10, 15, and 20 wt% were prepared by the solution casting method. Microporous ETS-4 will effectively block the methanol molecules by tortuous pathway effect because it plays a role as a site-selective adsorbent. The water uptake and selectivity of the composite membranes increased with an increase in the ETS-4 content, whereas their ion exchange capacity, proton conductivity, methanol permeability decreased due to the addition of ETS-4, which contains no sulfonic acid group. All things considered, 10 wt% loading was an optimized content of ETS-4 in the Nafion matrix to exhibit the best overall performance in DMFCs.**

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