

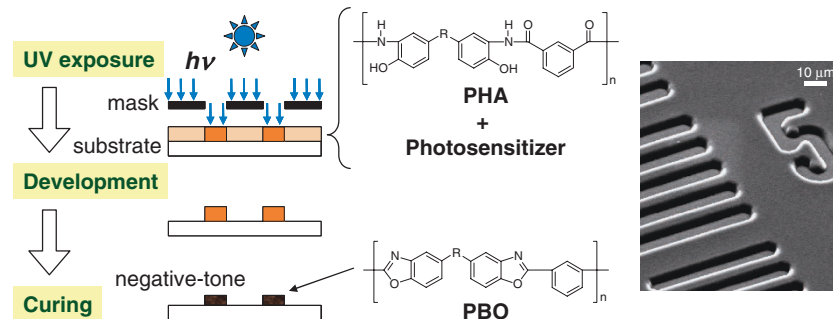
Recent Development of Photosensitive Polybenzoxazoles

K. FUKUKAWA and M. UEDA

[Review Article]

Vol. 38, No. 5, pp 405–418 (2006)

In microelectronics industry, photosensitive polybenzoxazoles (PSPBOs) have been attracting great attention as insulating materials. This article reviews recent works on developments of PSPBOs, involving a brief introduction, typical PSPBO formulations, facile synthetic methods, highly performing PSPBOs (on sensitivity, transparency, low-*k*, etc), an efficient catalyst for low-temperature cyclization of poly(*o*-hydroxy amide) (PHA) into PBO and so on, with future prospects at the end.



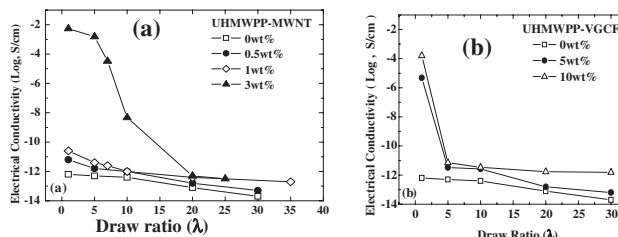
Thermal, Electrical and Mechanical Properties of Ultra-high Molecular Weight Polypropylene and Carbon Filler Composites

X. JIANG, Y. BIN, N. KIKYOTANI, and M. MATSUO

[Regular Article]

Vol. 38, No. 5, pp 419–431 (2006)

UHMWPP composites filled with MWNTs, VGCFs and CFs with different aspect ratio were prepared by gelation/crystallization from solutions. The electric conductivity of UHMWPP-MWNT composite film was the highest and the best thermal property among the three kinds of composite film when the the filler contents and the draw ratios were the same. On the other hand, Young's modulus of the drawn UHMWPP-VGCF composites was the highest. This indicates that the properties of the composites were sensitive to the aspect ratio associated with the flexibility of fillers.



Electric conductivity against draw ratio of the composites with the indicated contents (a) UHMWPP-MWNT and (b) UHMWPP-VGCF

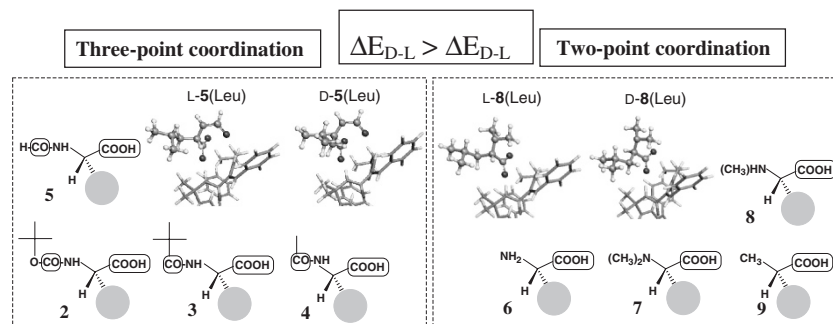
Theoretical Comparison between Three-Point and Two-Point Binding Modes for Chiral Discrimination upon the N-Terminal Sequence of 3₁₀-Helix

Y. INAI, N. OUSAKA, and Y. MIWA

[Regular Article]

Vol. 38, No. 5, pp 432–441 (2006)

Complex structure and energy were theoretically predicted between the N-terminal segment of right-handed 3₁₀-helix (1) and various acids based on D-/L-amino acids (2–9). Energy minimization from the initial models assuming the three-point or two-point coordination was carried out by molecular orbital calculation. The three-point coordination (2–5), compared with the two-point type (6–9), generates larger difference in energies of D-/L-complexes (ΔE_{D-L}), which are more stable for combination of L-isomer and right-handed helix.



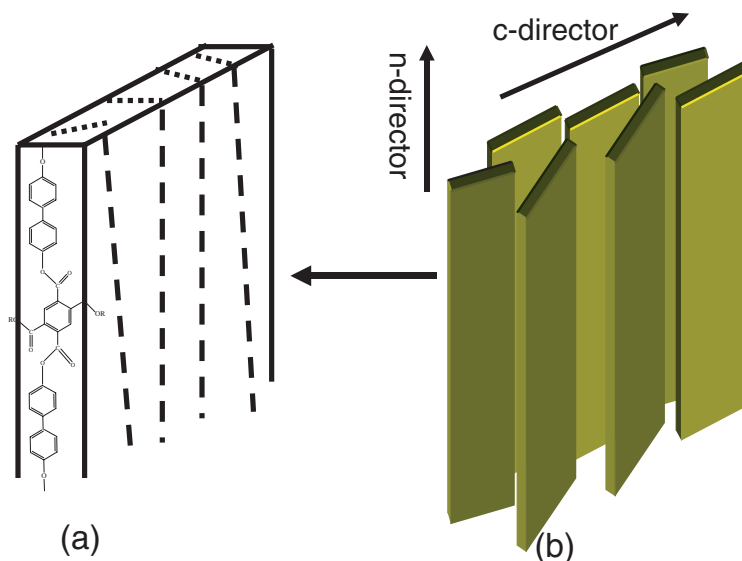
Aromatic Polyesters with Flexible Side Chains. 10. Studies on Biaxiality in Nematic Liquid Crystal of BC-*n* Polyester

K. FU, M. SONE, M. TOKITA,
and J. WATANABE

[Regular Article]

Vol. 38, No. 5, pp 442–446 (2006)

Illustration of the biaxial nematic liquid crystal. Here, the main chains are associated with each other to form the layer as in the lower temperature layered mesophase or crystal (refer to (a)), but the layers are packed with a greater degree of disorder as in (b). To produce such a disorder, the layer may be constructed with only short-range correlation length. Then, the additional director, *c*, exists along the plane of layer.



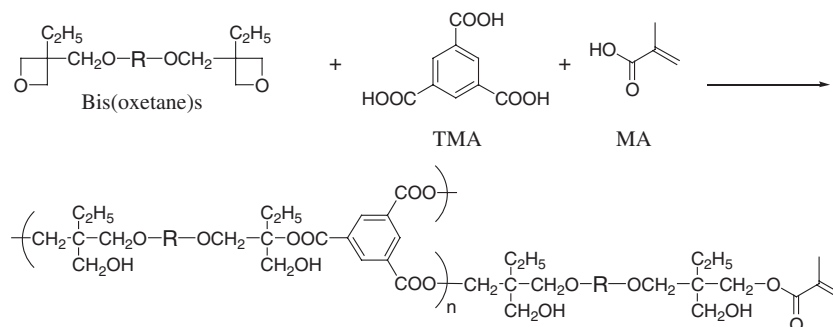
Synthesis of Photocrosslinkable Hyperbranched Polyesters with Terminal Methacryloyl Groups by the One-pot Polyaddition of Bis(oxetane)s with 1,3,5-Benzenetricarboxylic Acid and Methacrylic Acid

T. NISHIKUBO, H. KUDO, K. MARUYAMA,
T. NAKAGAMI, and H. MIYABE

[Regular Article]

Vol. 38, No. 5, pp 447–456 (2006)

The hyperbranched poly(ester)s with pendant primary hydroxy, methacryloyl, and oxetanyl groups were synthesized by the one-pot method for the polyaddition of bis(oxetane)s with 1,3,5-benzenetricarboxylic acid (TMA) and methacrylic acid (MA) in the presence of tetraphenylphosphonium chloride (TPPC). Alkaline-developable photosensitive hyperbranched polymer was prepared by the addition reaction of the synthesized hyperbranched poly(ester) with *cis*-1,2,3,6-tetrahydrophthalic anhydride (THPA), and its patterning property was examined to give the resolution of a 55 μm line width pattern by UV irradiation with 500 mJ/cm^2 .



Hyperbranched polymer with terminal methacryloyl groups

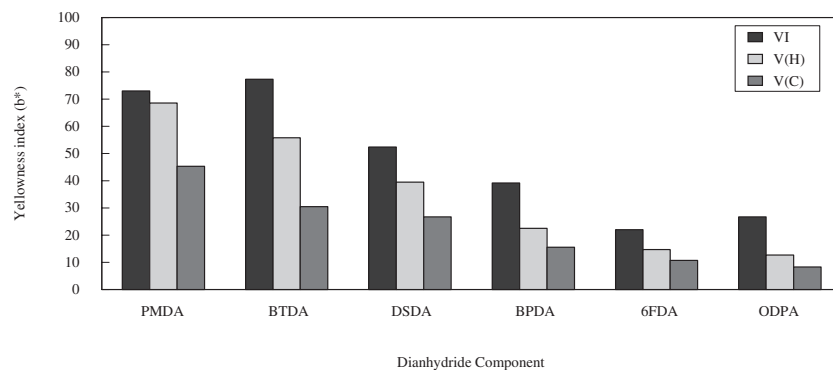
Light-Color Soluble Polyimides Based on α,α' -Bis[4-(4-amino-2-trifluoromethylphenoxy)phenyl]-1,3-diisopropylbenzene and Aromatic Dianhydrides

C.-P. YANG, Y.-P. CHEN,
E.-M. WOO, and S.-H. LI

[Regular Article]

Vol. 38, No. 5, pp 457–470 (2006)

A fluorine-containing crystalline diamine, α,α' -bis[4-(4-amino-2-trifluoromethyl phenoxy)phenyl]-1,3-diisopropylbenzene (**II**), was prepared through nucleophilic substitution reaction of 2-chloro-5-nitrobenzotrifluoride and α,α' -bis(4-hydroxyphenyl)-1,3-diisopropyl in the presence of potassium carbonate, followed by catalytic reduction with hydrazine and Pd/C. A series of polyimides (PIs) **V_{a-f}** were then synthesized from this diamine (**II**) by polymerizing with various commercially available aromatic dianhydrides (**III_{a-f}**). The Series-**V** exhibit better solubility, lighter color, and lower moisture absorption than the corresponding non-fluorinated counterpart of polyimides (Series-**VI**). Most polyimides had good mechanical properties and good thermal properties.



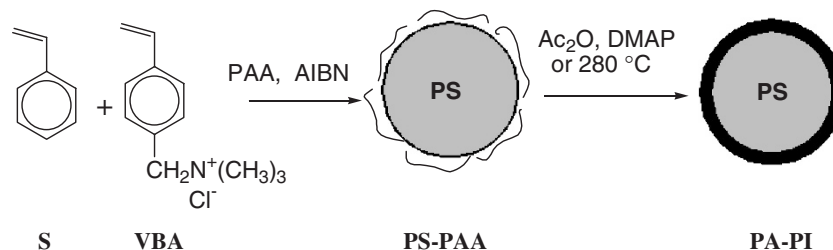
Preparation of Polystyrene-Polyimide Particles by Dispersion Polymerization of Styrene Using Poly(amic acid) as a Stabilizer

S. WATANABE, K. UENO,
M. MURATA, and Y. MASUDA

[Regular Article]

Vol. 38, No. 5, pp 471–476 (2006)

Dispersion polymerization of styrene (S) and 4-(vinylbenzyl)trimethylammonium chloride was conducted in ethanol–water medium using various aromatic poly(amic acids) (PAA) as stabilizers. The monodisperse particles with PAA were obtained in high yield using the optimum solvent depending on the PAA structure. The imidization of PAA on the particles proceeded with acetic anhydride and *N,N*-dimethylaminopyridine to form PS-polyimide (PS-PI) particles. The PS-PI particles were maintained in spherical shape by the thermal treatment up to 240 °C.



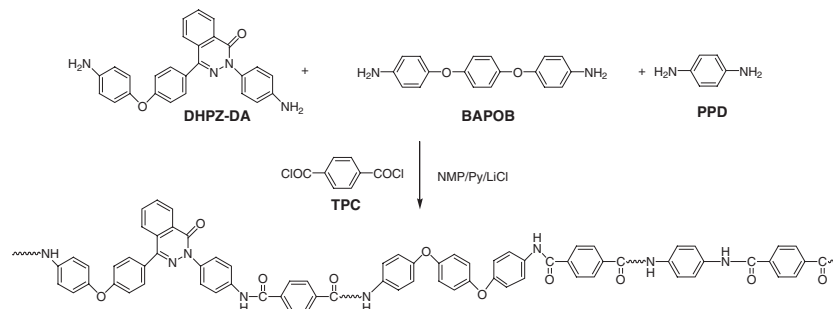
Preparation and Characterization of Lyotropic Liquid Crystalline Aromatic Copolyamides Containing Twisty and Non-coplanar Moiety

P. LIU, Q. LIANG, C. LIU, X. JIAN,
D. HONG, and Y. LI

[Regular Article]

Vol. 38, No. 5, pp 477–483 (2006)

A series of aromatic copolyamides were prepared from 1,2-dihydro-2-(4-aminophenyl)-4-[4-(4-(aminophenoxy)phenyl)](2H)phthalazin-1-one, *p*-phenylenediamine, 1,4-bis(4-aminophenoxy)benzene and terephthaloyl dichloride by low temperature solution polycondensation. The polymers were produced with high yields and relatively high inherent viscosities, ranging from 1.74 to 4.31 dL/g. The polymers had improved solubility and good thermal stability. WAXD measures indicated that these copolyamides were semicrystalline in nature. Most of the polymers exhibited nematic lyotropic liquid crystalline characteristics in some polar solutions.



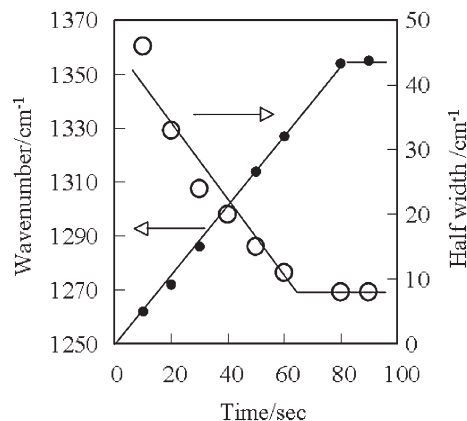
Electrochemical Polymerization of 6-(*N*-Allyl-1,1,2,2-tetrahydroperfluorodecyl)-amino-1,3,5-triazine-2,4-dithiol Monosodium on Aluminum

F. WANG, K. MORI, and Y. OISHI

[Regular Article]

Vol. 38, No. 5, pp 484–489 (2006)

Polymer thin films prepared by electrochemical polymerization of triazinedithiol monosodium on aluminum plate, exhibit to be highly ordered and packing. Polymer films on the substrate of Al are used to fabricate parallel plate capacitors having capacitances of 1.33 to 2.06 $\mu\text{F}/\text{cm}^2$. The relative dielectric constants of polymer films are very high to be in the range of 142 to 175.



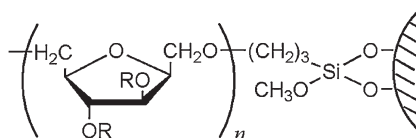
Chromatographic Application of 3,4-Di-*O*-alkyl-(1→6)-2,5-anhydro-D-glucitol for Separation of Alkali and Alkaline Earth Metal Ions

T. SATOH, I. OTSUKA, R. SAKAI, K. SAITOH, S. UMEDA, K. TSUDA, H. HASHIMOTO, and T. KAKUCHI

The chromatographic property for the separation of alkali and alkaline earth metal halides has been studied using the HPLC columns packed with 3,4-di-*O*-alkyl-(1→6)-2,5-anhydro-D-glucitol-bound silica gels (alkyl: ethyl, **Si-1a**; methyl, **Si-1b**; allyl, **Si-1c**). For nitric acid solution as the mobile phase, silica gels **Si-1a-c** exhibited the separation characteristic for alkali metal chlorides, which eluted in the order of $\text{Li}^+ < \text{Na}^+ \ll \text{K}^+ < \text{Rb}^+ < \text{Cs}^+$. For alkaline earth metal chlorides, the separation of Ba^{2+} toward Mg^{2+} , Ca^{2+} , and Sr^{2+} is observed.

Vol. 38, No. 5, pp 490–494 (2006)

[Note]



Si-1a: R= -CH₂CH₃
Si-1b: R= -CH₃
Si-1c: R= -CH₂CH=CH₂

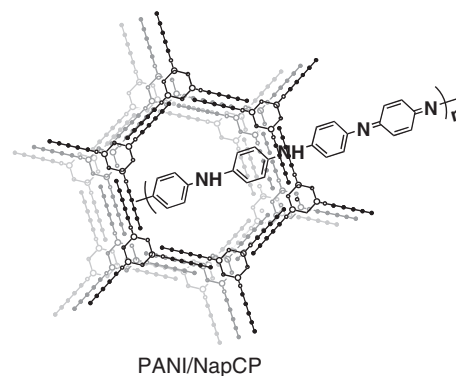
Inclusion of Polyaniline in the Channel Constructed from Tris(2,3-naphthylendioxy)cyclotriphosphazene

I. YAMAGUCHI and T. YAMAMOTO

Standing an *N*-methyl-2-pyrrolidone solution containing PANI and NapCP gave an inclusion adduct, PANI/NapCP. Thermal stability of PANI was improved by inclusion in the channel constructed from NapCP. The quinoid rings in PANI in the inclusion adduct received reduction with N_2H_4 . PANI in the inclusion adduct accepted I_2 -doping and was converted into a semiconducting material.

Vol. 38, No. 5, pp 495–497 (2006)

[Note]



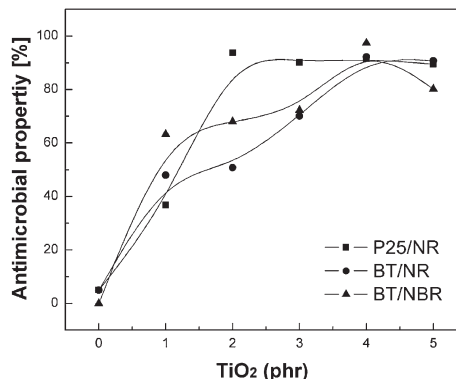
Morphology, Antimicrobial and Mechanical Properties of Nano-TiO₂/Rubber Composites Prepared by Direct Blending

G. LIN, M. TIAN, Y.-L. LU, X.-J. ZHANG, and L.-Q. ZHANG

The antimicrobial ability of rubber composites is dramatically improved by compounding small amount of nano-TiO₂.

Vol. 38, No. 5, pp 498–502 (2006)

[Note]



Unique Physical Adsorption of Proteins onto Double Stranded Stereocomplex Films Composed of Stereoregular Poly(methyl methacrylate)

T. SERIZAWA, K. YAMASHITA,
and M. AKASHI

Vol. 38, No. 5, pp 503–506 (2006)

[Note]

The physical adsorption of human serum albumin (HSA), fibrinogen, and lysozyme onto ultrathin poly(methyl methacrylate) stereocomplex films with a double stranded surface structure, and onto single component films conventionally prepared, was analyzed using a quantitative quartz crystal microbalance technique. Both HSA and fibrinogen formed adsorbed monolayers, whereas lysozyme formed multilayers at greater concentrations. The maximum amount of adsorption and the apparent adsorption constants for the stereocomplex film were significantly different from those for the component homogeneous films.

