

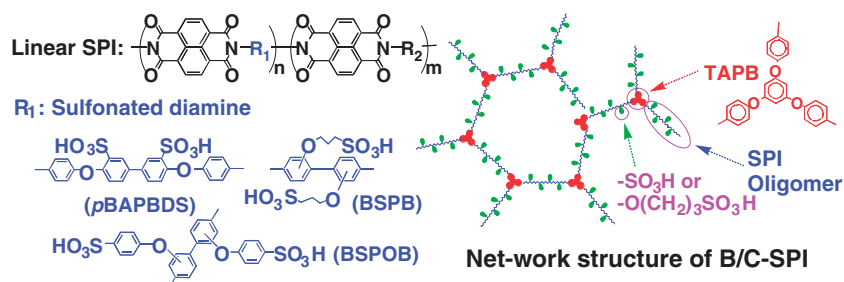
On the Development of Naphthalene-Based Sulfonated Polyimide Membranes for Fuel Cell Applications

Y. YIN, O. YAMADA, K. TANAKA,
and K. OKAMOTO

[Review Article]

Vol. 38, No. 3, pp 197–219 (2006)

Well-designed sulfonated polyimide (SPI) membranes have reasonably high water stability and proton conductivity at higher temperature. They displayed unique water and methanol crossover under fuel cell operation conditions. These SPI membranes have high potential for applications in PEFC at high temperature and DMFC with high methanol concentrations.



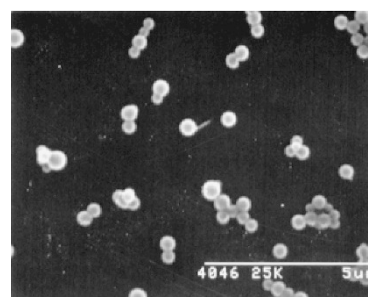
Hydrolytic Co-condensation of Phenyltriethoxysilane with γ -Aminopropyltriethoxysilane in the Presence of Sodium Dodecyl Sulfate

S. LIU, H. YE, Y. ZHOU, and J. ZHAO

[Regular Article]

Vol. 38, No. 3, pp 220–225 (2006)

Poly(aminopropyl/phenylsilsequioxane) was prepared by the hydrolytic co-condensation of hydrophobic phenyltriethoxysilane and hydrophilic γ -aminopropyltriethoxysilane under basic catalysis in the presence of sodium dodecyl sulfate. The copolymer took on high amino group content. Spheroidal particles were obtained in the equal molar ratio of PTES and APS and lower PTES concentration.



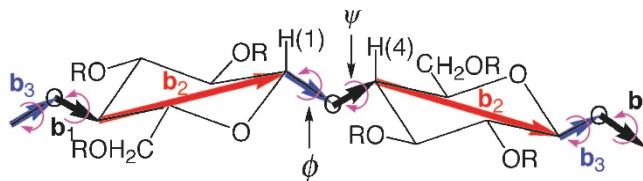
Local Conformation of the Cellulosic Chain in Solution

H. YANAI and T. SATO

[Regular Article]

Vol. 38, No. 3, pp 226–233 (2006)

The temperature dependence of the persistence length for cellulose tris(phenyl carbamate) in THF, estimated from intrinsic viscosity data, was successfully explained by the broken wormlike chain model, where each glucose residue in the cellulosic chain is assumed to take left-handed 3/1 or 2/1 helical state and occasionally a kink state generated by a glucosidic bridge angle fluctuation. The torsional fluctuation is considerably small, but the cellulosic chain cannot be regarded as a regular helix in solution because of the two energetically favored helical states.



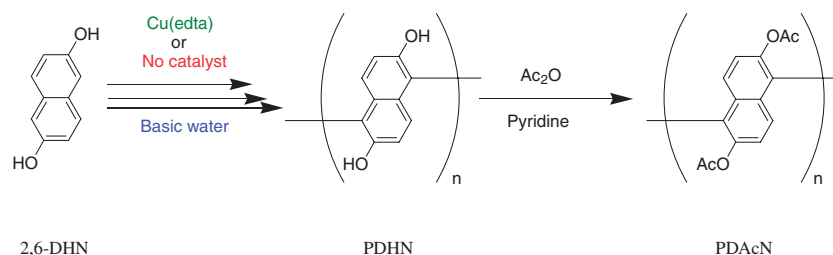
Oxidative Coupling Polymerization of 2,6-Dihydroxynaphthalene in Basic Water

Y. TSUTSUI, N. NUMAO, and M. SUZUKI

[Regular Article]

Vol. 38, No. 3, pp 234–239 (2006)

The oxidative coupling polymerization of 2,6-dihydroxynaphthalene was found to take place in basic water. Alkaline metal bases resulted in forming a large amount of the quinone and the ether units in the presence of the copper catalyst. When amines were employed as the base, their structures affected the polymerization results. Some primary amines produced poly(2,6-dihydroxy-1,5-naphthylene) without the side reactions. Surprisingly, it was found that the catalyst was dispensable for amines to promote this polymerization.



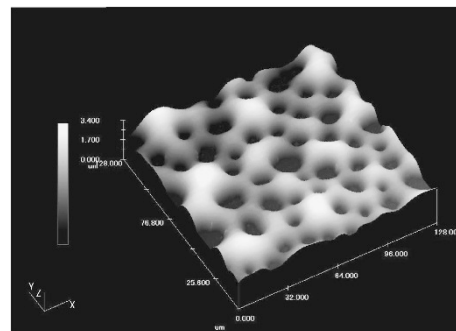
Hyperbranched Polymer through Initiator-Fragment Incorporation Radical Copolymerization of Divinyl Adipate with Allyl Acetate: Synthesis, Characterization, Dye Solubilization, Metal-Nanoparticle Stabilization, and Porous Film Formation

T. SATO, K. NOMURA, T. HIRANO, and M. SENO

[Regular Article]

Vol. 38, No. 3, pp 240–249 (2006)

The copolymerization of divinyl adipate as an effective cross-linker and allyl acetate with dimethyl 2,2'-azobisisobutyrate of high concentrations at 80 °C in benzene proceeded homogeneously without any gelation to give soluble copolymer. The resulting copolymer contained a large fraction (38 mol%) of the methoxycarbonylpropyl group as initiator-fragment. The hyperbranched copolymer showed potentials in solubilization of Rhodamine 6G as a dye prove and stabilization of metal nanoparticles. A porous film was obtained by simply casting a copolymer solution in THF.



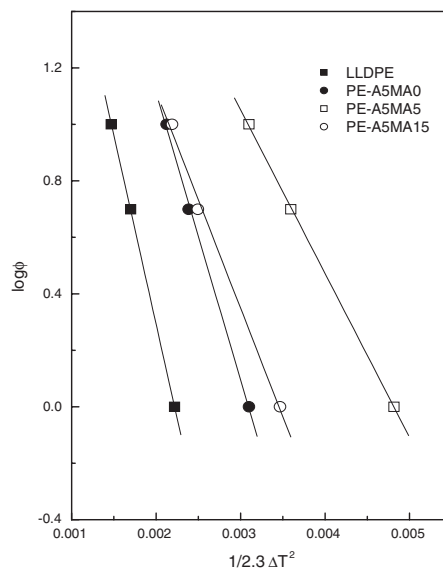
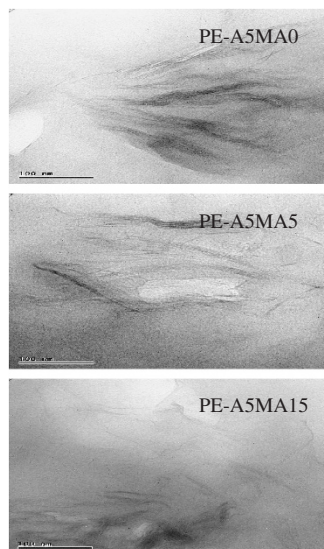
Effect of Maleated Polyethylene on the Crystallization Behavior of LLDPE/Clay Nanocomposites

Y. C. KIM

[Regular Article]

Vol. 38, No. 3, pp 250–257 (2006)

The dispersion of 20A in LLDPE matrix depended on the amount of MA-g-PE. The clays are exfoliated and dispersed homogeneously in the LLDPE/20A nanocomposites as certified by TEM image. The degree of super cooling reduced when 20A was introduced into LLDPE with MA-g-PE. The nucleation activity (ϵ) of PE-A5MA0 without MA-g-PE was 0.75. On the other hand, the values of the composites with MA-g-PE were in the range of 0.37–0.56. These results show that the silicate (20A) is an effective nucleating agent and the composite system with MA-g-PE is more active in nucleation process.



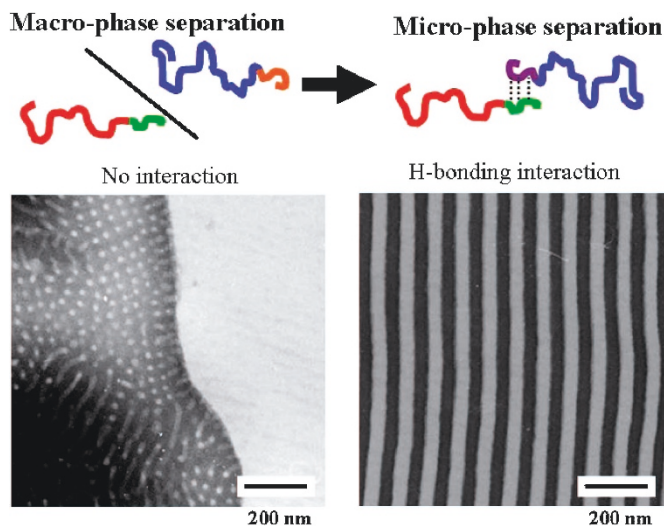
Preparation and Characterization of Diblock Copolymers of the AB and CD Types and their Self-Assembled Structure by Hydrogen Bonding Interaction

T. ASARI, S. MATSUO, A. TAKANO,
and Y. MATSUSHITA

[Regular Article]

Vol. 38, No. 3, pp 258–263 (2006)

A pair of diblock copolymers, poly(isoprene-*block*-2-vinylpyridine) (IP) and poly(styrene-*block*-(4-*tert*-butoxystyrene)) (StB) were successfully prepared by controlled anionic polymerizations. StB diblock copolymer was treated with HCl and hence poly(*tert*-butoxystyrene) can be converted into poly(4-hydroxystyrene) (H), so that poly(styrene-*block*-4-hydroxystyrene) (SH) was produced quantitatively. Morphological observation using transmission electron microscopy (TEM) revealed that IP/SH blend, forms homogeneous and periodic lamellar structure due to hydrogen bonding between P and H when IP/SH weight ratio is 50/50, though the volume fraction of polyisoprene in the former and that of polystyrene in the latter are both approximately 0.9.



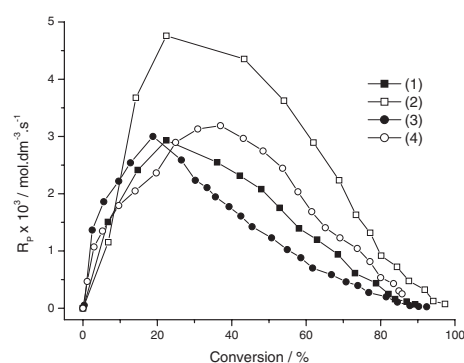
Microemulsion Polymerization of Butyl Acrylate under Ultrasound Irradiation

I. CAPEK, S. JANÍČKOVÁ, D. DONESCU,
Y. SAROV, and I. W. RANGELOW

[Regular Article]

Vol. 38, No. 3, pp 264–276 (2006)

The microemulsion polymerization of butyl acrylate stabilized by ionic emulsifier and initiated by oil-soluble dibenzoyl peroxide or lauroyl peroxide initiators have been studied under conventional (without ultrasound irradiation) and ultrasonic conditions. The exit (desorption) rate constants k'_{des} ($\text{cm}^2 \text{s}^{-1}$) and k_{des} (s^{-1}) (Ugelstad/O'Tool approach, Nomura model and Gilbert model) as a function of temperature and the initiator type and concentration for the CMEP and NMEP were evaluated.



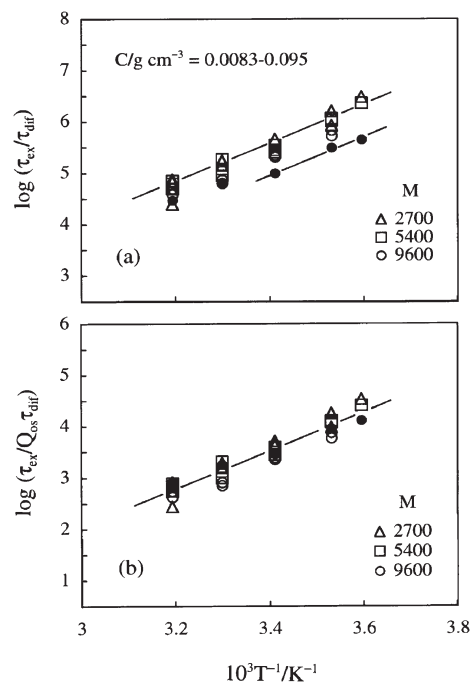
Dynamics of Monofunctional Polybutadienyl Lithium Chains Aggregated in Benzene

Y. OISHI, H. WATANABE, T. KANAYA,
H. KAJI, and F. HORII

[Regular Article]

Vol. 38, No. 3, pp 277–288 (2006)

Dynamic behavior was investigated for living monoanionic polybutadienyl lithium chains of various molecular weights M . In benzene, the chains aggregated at their Li ends. The dissociation time of the aggregates τ_{ex} determined from ^7Li -NMR was much longer than a time τ_{dif} required for an aggregate to thermally collide with its neighbor, suggesting that the aggregates dissociated cooperatively through collision-induced fusion into a larger aggregate. Indeed, τ_{ex} normalized with τ_{dif} and an osmotic barrier for this collision Q_{os} was universally dependent on temperature.



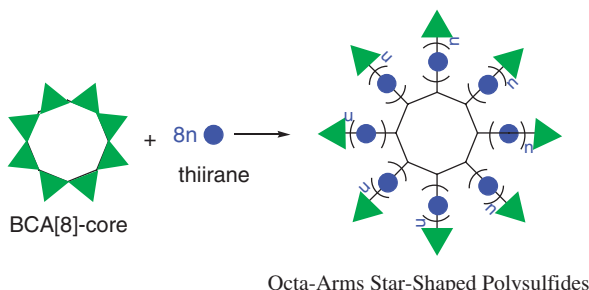
Syntheses and Refractive-Indices Properties of Novel Octa-Arms Star-Shaped Polysulfides Radiating from *p-t*-Butylcalix[8]arene Core

H. KUDO, H. INOUE, T. NISHIKUBO,
and T. ANADA

[Regular Article]

Vol. 38, No. 3, pp 289–297 (2006)

Octa-arms star-shaped polysulfides poly(PPS_(n)-BCA[8]_{core}) ($n = 5, 10, 15, 20, 30, 40, 50, 60,$ and 70) with high refractive-index were synthesized by the radiating from *p-t*-butylcalix[8]arene derivative as a core. The arm-lengths of poly(PPS_(n)-BCA[8]_{core}) could be controlled and their values (n_{DS}) of refractive-indices increased with sulfur contents. It was found that n_{DS} of star-shaped polymer were higher than those of linear ones due to their compact structures and high segment densities.



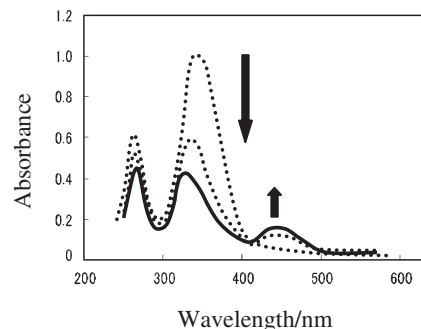
Synthesis and Properties of Substituted Polyacetylenes Containing a Photosensitive Moiety in the Side Group

K. WATARI and H. KOUZAI

[Note]

Vol. 38, No. 3, pp 298–301 (2006)

Novel acetylene-substituted monomers having various oxymethylene chains at their ends were synthesized using an azo group as a mesogen. The monomers were polymerized using the Rh catalyst $[\text{Rh}(\text{nbd})\text{Cl}]_2$ to obtain polymers on the order of tens of thousands. All polymers were soluble in organic solvents such as toluene, chloroform and tetrahydrofuran (THF). The obtained polymers were confirmed to exhibit photoisomerization between the *trans* and *cis* forms when irradiated by ultraviolet or visible light.



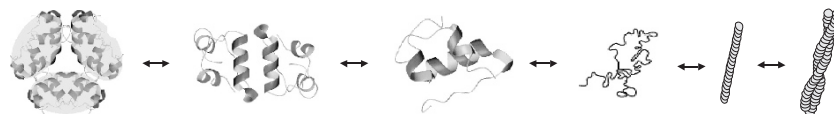
Pre-incubation under High Pressure Accelerates Amyloid Formation from Insulin

Y. FUJIMOTO, N. TANAKA, and S. KUNUGI

[Short Communication]

Vol. 38, No. 3, pp 302–305 (2006)

Drastic acceleration of amyloid formation was observed by pre-incubating insulin solutions under pressurized conditions (100 or 200 MPa) and releasing the applied pressure. Both nucleation and extension processes were accelerated. The results can be explained by the promotion of the multimer dissociation and pre-amyloid structure formation during the high pressure pre-incubation.



Thermoresponsive Property Controlled by End-Functionalization of Poly(*N*-isopropylacrylamide) with Phenyl, Biphenyl, and Triphenyl Groups

Q. DUAN, A. NARUMI, Y. MIURA, X. SHEN, S. SATO, T. SATOH, and T. KAKUCHI

[Short Communication]

Vol. 38, No. 3, pp 306–310 (2006)

N-Isopropylacrylamide (NIPAM) was polymerized using 2-chloropropionates with a series of hydrophobic groups, **1a–d**, as initiators and CuCl/tris[2-(dimethylamino)ethyl]amine (Me₆TREN) as the catalyst system. The products **2a–d** were assignable to the end-functionalized poly(*N*-isopropylacrylamide)s (PNIPAM's) with the respective hydrophobic groups. Aqueous solutions of **2a–d** were evaluated in terms of their lower critical solution temperatures (LCST's) and their molar masses under the LCST's. The biphenyl and triphenyl groups in the end-groups significantly affected the LCST's due to the formation of the huge PNIPAM-aggregates.

