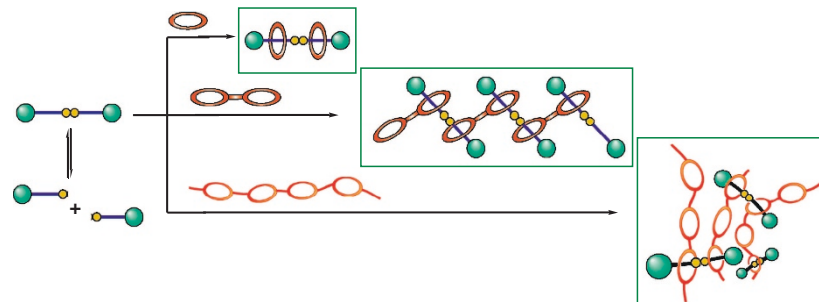


Polyrotaxane and Polyrotaxane Network: Supramolecular Architectures Based on the Concept of Dynamic Covalent Bond Chemistry

T. TAKATA

[Award Accounts: SPSJ Award (2004)]
Vol. 38, No. 1, pp 1–20 (2006)

This review article concerns with the syntheses of polyrotaxanes and polyrotaxane networks that can be constructed mainly on the basis of the concept of dynamic covalent bond chemistry. Synthesis of poly[3]rotaxane by the reaction of homoditopic monomers utilizing the thiol-disulfide interchange reaction was discussed in detail. Polyrotaxane network was prepared by a similar protocol from a polyfunctional crown ether and a shaped-shaped homoditopic axle containing two *sec*-ammonium salt moieties and centrally located disulfide bond. Some characteristics of the polyrotaxane network were demonstrated, including the recyclable property as the crosslinked polymer. The meaning and applicability of the reversible crosslinking/decrosslinking system are specially emphasized for potential application.



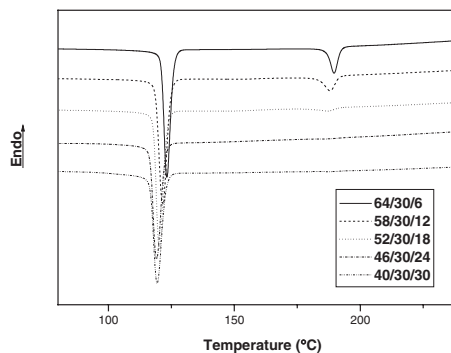
Supramolecular Architecture based on Dynamic Covalent Bond Chemistry

Crystallization Behaviors of Polypropylene/Polyamide-6 Blends Modified by a Maleated Thermoplastic Elastomer

H. LIU, T. XIE, Y. ZHANG, Y. OU, and G. YANG

[Regular Article]
Vol. 38, No. 1, pp 21–30 (2006)

With increasing concentration of the compatibilizer, both crystallization temperature (T_c) and crystallization enthalpy (ΔH_c) of PA6 component in PP/PA6/TPEg blends decreased. When TPEg amount was added up to 24 wt%, the crystallization of PA6 at its bulk T_c was almost completely suppressed and the complete concurrent crystallization of PA6 and PP matrix took place. This fractionated crystallization phenomenon was caused by the reduction in PA6 dispersed phase size due to the compatibilization role of added TPEg.

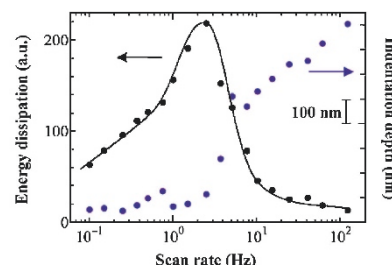


Nanotribology on Polymer Blend Surface by Atomic Force Microscopy

M. KOMURA, Z. QIU, T. IKEHARA, K. NAKAJIMA, and T. NISHI

[Regular Article]
Vol. 38, No. 1, pp 31–36 (2006)

Nanotribological properties of polystyrene/poly(vinyl methyl ether) blend surface mainly at its melt state were investigated using frictional loop measurement by atomic force microscopy (AFM). The energy dissipation of the friction showed each peak against both temperature and scan rate. The indentation simultaneously detected was largely restricted above the scan rate where the dissipation energy curve had a peak. We succeeded in drawing master curves for the energy dissipation and indentation depth using the same shift factor a_T .



Intrinsic Viscosity of Polyoxyethylene Alkyl Ether C_iE_j Micelles

S. SHIRAI, S. YOSHIMURA, and Y. EINAGA

[Regular Article]

Vol. 38, No. 1, pp 37–43 (2006)

Concentration *c* dependence of the apparent intrinsic viscosity $[\eta]_{app}$ for the hexaoxyethylene dodecyl ether C₁₂E₆ micelles at various temperatures *T*. The $[\eta]$ values significantly increase with *c* and *T*, reflecting micellar growth.

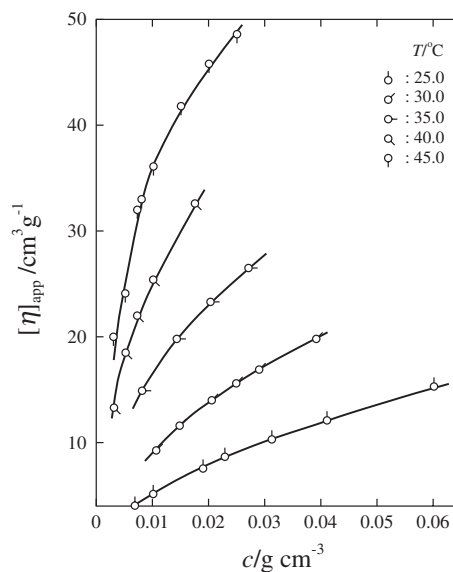


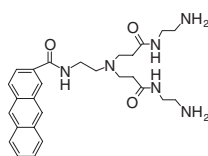
Photo-promoting Fabrication of Silver Nanoparticles in the Presence of Anthracenyl-Focal PAMAM Dendrons

C. HIRANO, T. IMAE, Y. YANAGIMOTO, and Y. TAKAGUCHI

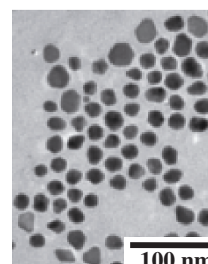
[Regular Article]

Vol. 38, No. 1, pp 44–49 (2006)

Silver nanoparticles passivated by poly(amido amine) dendron with an anthracenyl-focal point were fabricated by photo-reducing silver ions in water under room light. Silver nanoparticles were a mixture of spheres with a face centered cubic crystal structure and polygons with a hexagonal close packing structure.



An(G1-NH₂)



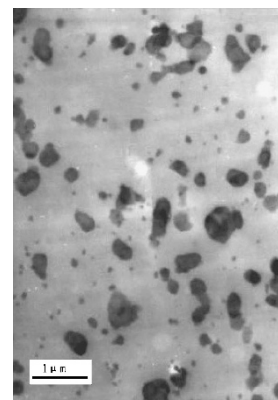
Novel Rubber Blends Made from Ultra-Fine Full-Vulcanized Powdered Rubber (UFPR)

M. TIAN, Y.-W. TANG, Y.-L. LU, J. QIAO, T. LI, and L.-Q. ZHANG

[Regular Article]

Vol. 38, No. 1, pp 50–56 (2006)

Novel rubber blends were firstly prepared by compounding ultra-fine full-vulcanized powdered rubber into EPDM matrix. As shown in Figure 1, full-vulcanized powdered SBR (UFSBRPR) can be finely and uniformly dispersed in EPDM as spherical particles with the size close to its original particle size, about 200 nm. Some unexpected and interesting phenomena were observed.



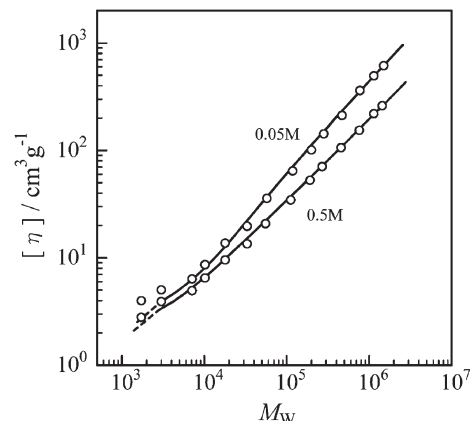
Chain Stiffness and Excluded-Volume Effects in Polyelectrolyte Solutions: Characterization of Sodium Poly(2-acrylamido-2-methylpropanesulfonate) in Aqueous Sodium Chloride

J. YASHIRO, R. HAGINO, S. SATO,
and T. NORISUYE

[Regular Article]

Vol. 38, No. 1, pp 57–63 (2006)

Sodium poly(2-acrylamido-2-methylpropanesulfonate) in 0.05 and 0.5 M aqueous NaCl at 25 °C is characterized by static light scattering, sedimentation equilibrium, and viscometry. It is shown that measured intrinsic viscosities and radii of gyration in the respective solvents are consistently described by combinations of the known theories for unperturbed wormlike chains and the quasi-two-parameter theory for excluded-volume effects.



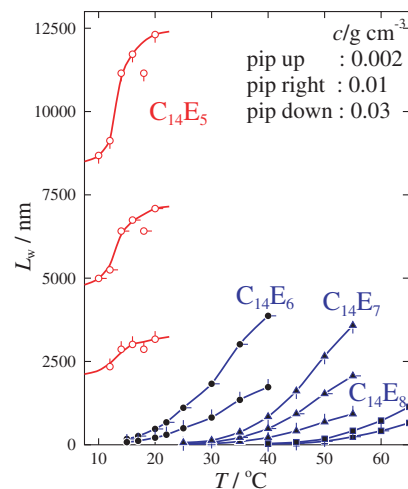
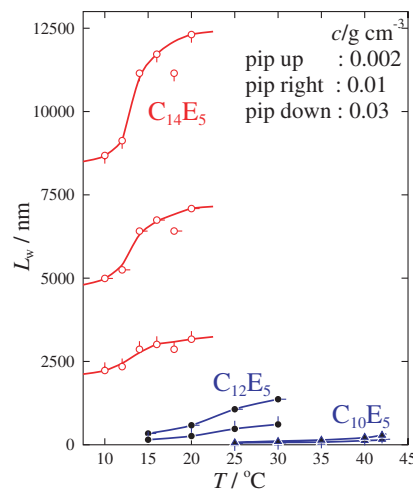
Wormlike Micelles of Pentaoxyethylene Tetradecyl Ether C₁₄E₅ and Hexaoxyethylene Hexadecyl Ether C₁₆E₆

Y. EINAGA, Y. INABA, and M. SYAKADO

[Regular Article]

Vol. 38, No. 1, pp 64–72 (2006)

Temperature and concentration dependence of the micellar length L_w for the polyoxyethylene alkyl ethers C_iE_j. The L_w values are larger for larger i at fixed j ($= 5$) and for smaller j at fixed i ($= 14$).



Pattern Doping into Non-Substituted Poly(*p*-phenylene vinylene) by a Simple Vacuum Process for a Multicolored Luminescence Medium

H. MOCHIZUKI, T. MIZOKURO,
N. TANIGAKI, X. MO, and T. HIRAGA

[Regular Article]

Vol. 38, No. 1, pp 73–78 (2006)

Functional dyes could be dispersed into non-substituted poly(*p*-phenylene vinylene) (PPV), which shows a poor processability due to its insoluble and infusible, by the vacuum process under the thermal equilibrium state without the structural damage of PPV. Furthermore, a pattern doping with 4-(dicyanomethylene)-2-methyl-6-(4-dimethylaminostyryl)-4*H*-pyran could be carried out resulting in production of multicolored luminescent medium.



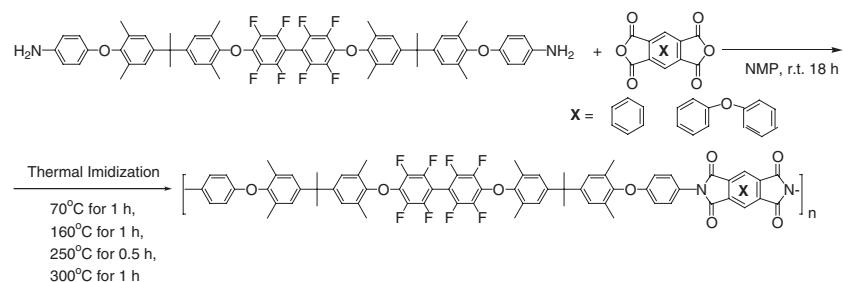
Synthesis and Characterization of Novel Low-*k* Polyimides from Aromatic Dianhydrides and Aromatic Diamine Containing Phenylene Ether and Perfluorobiphenyl Units

Y. WATANABE, Y. SHIBASAKI, S. ANDO, and M. UEDA

[Regular Article]

Vol. 38, No. 1, pp 79–84 (2006)

Novel fluorinated aromatic polyimides exhibiting very low dielectric constants were prepared from aromatic dianhydrides and aromatic diamines containing phenylene ether and perfluorobiphenyl units. The poly(imide)s showed very low dielectric constants (2.65–2.68) and relatively high thermal stability (5% weight loss temperature around 450 °C).



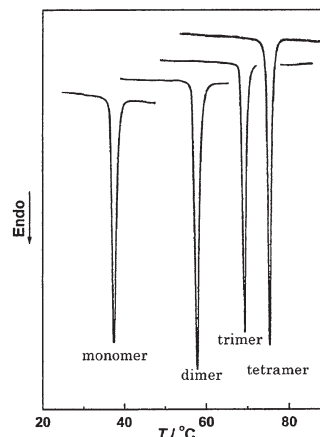
Thermal Properties of Monomeric, Dimeric, Trimeric, and Tetrameric Model Compounds for Biodegradable Poly-(decamethylene sebacate)

Y. OGAWA, M. OKEDA, and N. MATSUMOTO

[Note]

Vol. 38, No. 1, pp 85–87 (2006)

A series of oligomers for use as a biodegradable aliphatic polyester model such as poly(decamethylene sebacate) were synthesized from sebacic acid, 1,10-decanediol, and decanoic acid. The oligomers (C10-*n*) were separated by a silica gel column, and pure monomer, dimer, trimer, and tetramer were obtained. The effect of the degree of polymerization on the thermal properties of C10-*n* was studied. Melting enthalpies and entropies of *n*-mers were observed to follow a linear equation in terms of *n*. The equilibrium melting temperature of poly-(decamethylene sebacate) obtained from $\Delta H/\Delta S$ was 94 °C.



Synthesis of Soluble Polyimides Based on Alicyclic Dianhydride in Ionic Liquids

Y. TSUDA, T. YOSHIDA, and T. KAKOI

[Note]

Vol. 38, No. 1, pp 88–90 (2006)

This paper reports the application of ionic liquid as solvents for the synthesis of alicyclic polyimides that have the same structure reported previously in our lab. In comparison with the conventional two-step polymerization method using NMP as a solvent, ionic liquids can give the same molecular weight polyimides by shorter reaction time without additional catalysts.

