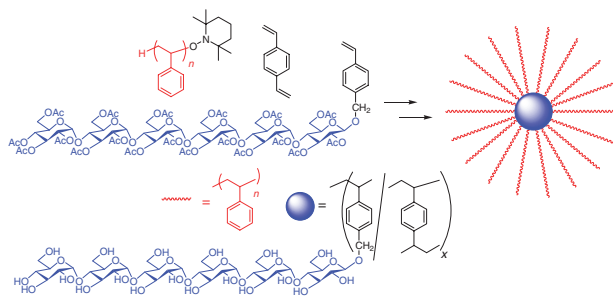


REVIEW ARTICLE

**Synthesis of Glycoconjugated Branched Macromolecular Architectures**

We report an overview focusing on the synthesis of vinyl polymers with three-dimensional structures utilizing the functionality of saccharides and preparations of glycoconjugated branched vinyl polymers. Star-like reversed-type polymeric aggregates have been generated by end-functionalized polymers with saccharides. The functionalities of the glucose, inositol, sucrose, and cyclodextrins have been used for the syntheses of star polymers. A new class of glycoconjugates has been prepared, which includes glycopolymer stars, hyperbranched glycopolymers, star microgels with a glycoconjugated periphery or core, and poly(vinyl saccharide) microgels.

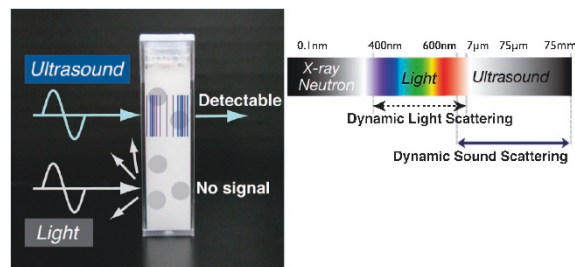


A. NARUMI and T. KAKUCHI  
Vol. 40, No. 5, pp 383–397 (2008)

SHORT COMMUNICATION

**High Frequency Dynamic Ultrasound Scattering from Microsphere Suspensions**

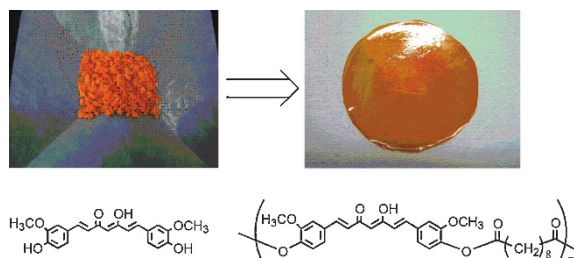
When ultrasound waves pass through a suspension of microsphere whose particle size is comparable with the wavelength of sound, scattering is observed by analogy with visible light. Since the ultrasound waves can transmit through opaque media, it allows us to study the structure and dynamics in the micrometer range. To achieve this purpose, we have developed a high frequency dynamic sound scattering (DSS) technique using 20 MHz longitudinal ultrasound to characterize microspheres suspended in water.



M. KOHYAMA, T. NORISUYE, and Q. TRAN-CONG-MIYATA  
Vol. 40, No. 5, pp 398–399 (2008)

**Novel Bio-Based Polyesters Derived from Curcumin as an Inherent Natural Diol Monomer**

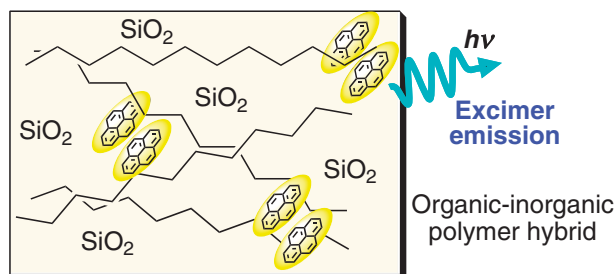
Curcumin, a naturally abundant dye in the *Turmeric plant* was for the first time employed as a monomer for polymer synthesis. A polycondensation between curcumin and sebacyl chloride afforded polyesters whose molecular weights were 32000–5000 in moderate yields. The obtained polymers can be regarded as polymer ligand which would form various  $\beta$ -diketonate complex with metal ions. For instance, the polyester was subjected to polymer reaction with  $(bpy)_2RuCl_2$  to form the corresponding polymer ruthenium complex efficiently.



N. MATSUMI, N. NAKAMURA, and K. AOI  
Vol. 40, No. 5, pp 400–401 (2008)

### Synthesis and Photoluminescence Properties of Pyrene-Incorporated Organic-Inorganic Polymer Hybrids

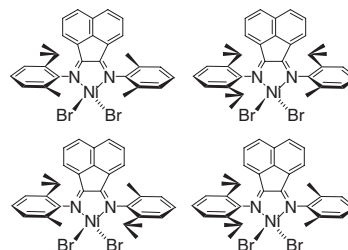
As compared with organic polymers or a silica glass as a matrix, the excimer emission of pyrene increased in the polymer hybrids synthesized from methacryloyl monomers, tetramethoxysilane (TMOS) and pyrene. The excimer emission can be affected by changing the organic/inorganic ratio or the species of organic polymers. Furthermore, the emission sensitivity against oxygen in the polymer hybrids was found to be tuned by the organic/inorganic ratio in the polymer hybrids or the oxygen permeability of the organic polymers.



K. KOKADO, T. IWAMURA, and Y. CHUJO  
Vol. 40, No. 5, pp 402–408 (2008)

### Ethylene Polymerizations with Unsymmetrical ( $\alpha$ -Diimine)nickel(II) Catalysts

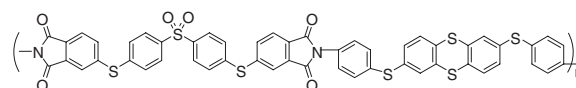
Ethylene polymerizations with unsymmetrical ( $\alpha$ -diimine)nickel(II) catalysts having controlled ortho substituents on aromatic rings revealed that, when the catalysts have the same composition of the ortho substituents, the catalyst with two ortho isopropyl substituents on one side and two ortho methyl substituents on the other side produced polyethylenes with higher branching densities and lower molecular weights than the catalyst with one ortho isopropyl and one ortho methyl substituent on each side.



M. JEON and S. Y. KIM  
Vol. 40, No. 5, pp 409–413 (2008)

### Synthesis of Highly Refractive and Transparent Polyimides Derived from 4,4'-[*p*-Sulfonylbis(phenylenesulfanyl)]diphthalic Anhydride and Various Sulfur-containing Aromatic Diamines

Highly refractive and transparent polyimides (PIs) were prepared from a *para*-substituted sulfonyl-bridged dianhydride, 4,4'-[*p*-sulfonylbis(phenylenesulfanyl)]diphthalic anhydride and various sulfur-containing aromatic diamines including 4,4'-thiobis[*p*-phenylenesulfanyl]aniline, 4,4'-sulfonylbis[*p*-phenylene-sulfanyl]aniline, and 2,7-bis(*p*-aminophenylenesulfanyl)thianthrene by employing a two-step polycondensation procedure. The PI films exhibited good optical transmittances exceeding 85% at 450 nm and high refractive indices of 1.7169–1.7420 at 632.8 nm.



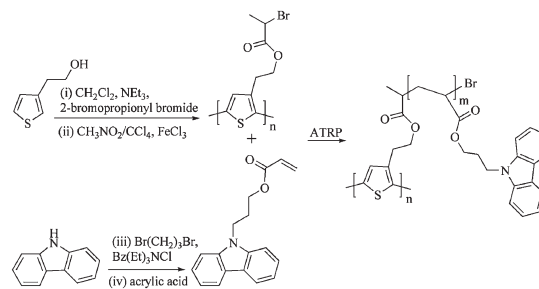
PI-3

Refractive index: 1.7420  
Birefringence : 0.0093  
 $T_{450\text{nm}}$  : 86%,  $T_g$  : 235 °C

Y. SUZUKI, J. LIU, Y. NAKAMURA, Y. SHIBASAKI,  
S. ANDO, and M. UEDA  
Vol. 40, No. 5, pp 414–420 (2008)

### Synthesis and Properties of a Novel Brush-type Copolymers Bearing Thiophene Backbone and 3-(*N*-carbazolyl)propyl Acrylate Side Chains for Light-emitting Applications

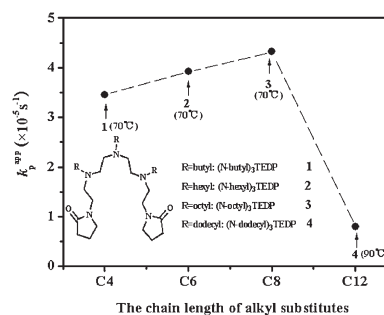
A novel graft copolymer (PT-*g*-PCPA) containing polythiophene (PT) backbone and hole transporting poly[3-(*N*-carbazolyl)propyl acrylate] (PCPA) chains is successfully synthesized. UV-vis and fluorescence analyses confirmed that introduction of PCPA side chains trapped polythiophene backbone in a "solution-like" conformation, which inhibited the aggregation of polythiophene backbone effectively. Additionally, the energy transfer process from PCPA side chains to the PT backbone was also evidenced. Electroluminescence devices fabricated from the copolymer demonstrated that copolymer could act as both light emissive and hole-transporting materials.



J. SHEN, H. MASAOKA, K. TSUCHIYA, and K. OGINO  
*Vol. 40, No. 5, pp 421–427 (2008)*

### Pyrrolidin-2-one Structure Derivatives as Novel Ligands for Copper-based Atom Transfer Radical Polymerization (ATRP)

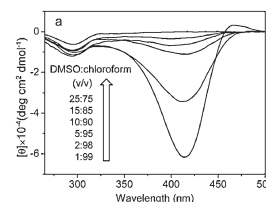
Novel ligands (N-R)<sub>3</sub>TEDP for copper-based ATRP were developed. The well-controlled polymerization of MMA was achieved. The apparent activation energy  $\Delta E_{app}^\ddagger$  of 43.72 kJ·mol<sup>-1</sup> of ATRP catalyzed by CuBr/(*N*-butyl)<sub>3</sub>TEDP and the low  $\Delta H_{eq}^\theta$  value (21.38 kJ·mol<sup>-1</sup>) were calculated. Influence of alkyl substitute of ligands was investigated and the results showed that the activity of these ligands in the ATRP gave the following order: C12  $\ll$  C4  $\sim$  C6  $\sim$  C8.



Z. HU, W. LIU, H. ZHANG, G. XIAO, X. ZHOU,  
B. XIA, X. HONG, and G. ZHANG  
*Vol. 40, No. 5, pp 428–435 (2008)*

### Influence of Solvent on the Secondary Structure of Helical Poly(*N*-propargyl-(1*R*)-camphor-10-sulfamide)

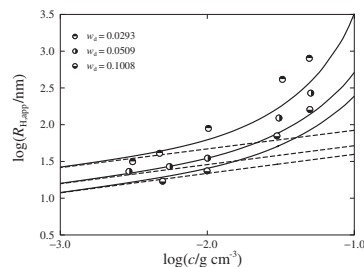
The influence of solvent on the geometrical and secondary structure of a helical polymer, poly(*N*-propargylsulfamide), was investigated. Solvent influenced the mobility of the polymer's main chain and the polymer adopted stable helices or disordered conformation in different solvents. It could take helical conformation in toluene. In mixed solvent comprising DMSO and chloroform, it changed from helical conformation to random coil with increasing the content of DMSO.



Z. ZHANG, J. DENG, J. LI, and W. YANG  
*Vol. 40, No. 5, pp 436–441 (2008)*

### Change in Characteristics of Wormlike Micelles of Hexaoxyethylene Tetradecyl and Decyl Ethers ( $C_{14}E_6$ and $C_{10}E_6$ ) with Uptake of *n*-Dodecane

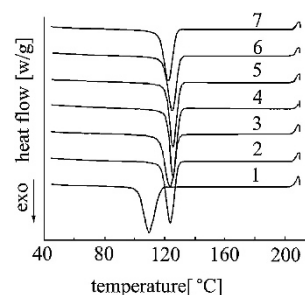
For the hexaoxyethylene tetradecyl and decyl ethers  $C_{14}E_6$  micelles containing *n*-dodecane, the apparent hydrodynamic radius  $R_{H,app}$  decreases with increasing *n*-dodecane content  $w_d$  contrary to the case of the micelles containing *n*-alcohol. The values of  $R_{H,app}$  for each micelles with fixed  $w_d$  significantly increase with surfactant concentration  $c$  due to the intermicellar hydrodynamic interactions apart from the value  $R_H$  for the “isolated” micelle shown by the dashed lines as in the case of the micelles containing *n*-alcohol.



M. OCHI, S. MATSUE, and Y. EINAGA  
*Vol. 40, No. 5, pp 442–449 (2008)*

### Crystallization Behavior and Crystal Morphology of Linear/Long Chain Branching Polypropylene Blends

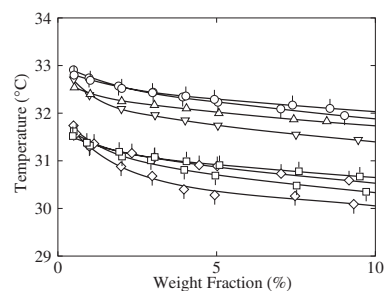
Crystallization behavior, crystal structure and morphology of LPP/LCBPP blends were studied. Upon incorporation of LCBPP into LPP, the melt strength and the strain rate durability of the latter were obviously enhanced, the nucleation and overall crystallization rates were increased and crystallization temperature elevated. At some middle fraction of LCBPP, the most remarkably effects were observed. The content of the branched architecture and the entanglement density were considered responsible for these influences.



X.-D. WANG, Y.-X. ZHANG, B.-G. LIU,  
Z.-J. DU, and H.-Q. LI  
*Vol. 40, No. 5, pp 450–454 (2008)*

### Cloud Points in Aqueous Poly(*N*-isopropylacrylamide) Solutions

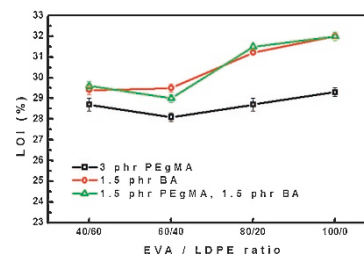
The cloud point was determined for aqueous solutions of four kinds of poly(*N*-isopropylacrylamide) samples synthesized by radical polymerization in methanol (◊, ◯), *tert*-butanol (▽, △), benzene (◻, ◻), and 1,4-dioxane (◇, ◇). The cloud points for the samples synthesized in benzene and 1,4-dioxane have been found to be definitely lower than those for the samples synthesized in methanol and *tert*-butanol. The observed deviation may be regarded as arising from the difference in the primary structure between the samples.



T. KAWAGUCHI, Y. KOJIMA,  
M. OSA, and T. YOSHIZAKI  
*Vol. 40, No. 5, pp 455–459 (2008)*

### Poly(Ethylene Vinyl Acetate) (EVA)/Low Density Polyethylene (LDPE)/Ammonium Polyphosphate (APP) Composites Cross-linked by Dicumyl Peroxide for Wire and Cable Applications

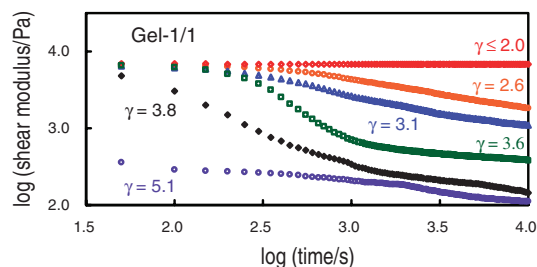
Improved action of ammonium polyphosphate in flame retardancy of LDPE/EVA composites was achieved after addition of a small amount of boric acid. Good mechanical properties of the formulations containing boric acid can be achieved after addition of small amount of PEGMA, which can improve compatibility of boric acid to the composites. At the same time, the presence of PEGMA has no influence on the flame retardancy as well as thermal stability and electrical properties of LDPE/EVA/APP formulations containing boric acid.



J. MOSNÁČEK, A. A. BASFAR,  
T. M. SHUKRI, and M. A. BAHATTAB  
*Vol. 40, No. 5, pp 460–464 (2008)*

### Nonlinear Mechanical Behavior of Scarcely Crosslinked Poly(dimethyl siloxane) Gel: Effect of Strand Length Polydispersity

Nonlinear mechanical behavior was examined for a scarcely crosslinked poly(dimethyl siloxane) gel (Gel-1/1) having highly polydisperse strands of an average molecular weight  $M_c = 190$  K. Under constant-rate elongation, Gel-1/1 exhibited rupture at an elongational ratio much smaller than that expected for monodisperse strands with the same  $M_c$ . Under large step shear, Gel-1/1 exhibited nonlinear decay of the shear modulus with time (Figure). These nonlinearities were attributed to scission of the polydisperse strands propagating from short to long strands.

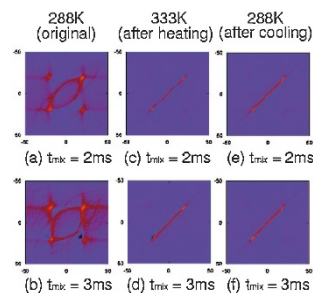


H. TAKAHASHI, Y. ISHIMURO, and H. WATANABE  
*Vol. 40, No. 5, pp 465–474 (2008)*

## NOTE

### The Dynamic Structure of Regioregulated Poly(4-methylthiazole-2,5-diyl)

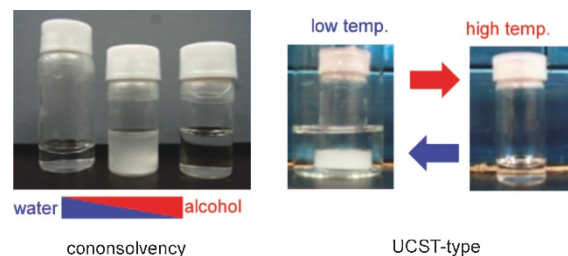
The dynamics of regioregulated poly(4-methylthiazole-2,5-diyl) (HH-P4MeTz) was investigated by various solid-state NMR spectroscopies and DSC measurements. These measurements revealed the existence of a quasicrystalline phase in which the backbone twists due to the weakening of  $\pi$ -stacking take place. At 288 K,  $^2$ D two-dimensional exchange NMR detected slow dynamics with a rate of an order of  $10^2$  Hz for the methyl group in HH-P4MeTz.



S. MORI, T. YAMAMOTO, N. ASAKAWA,  
K. YAZAWA, and Y. INOUE  
*Vol. 40, No. 5, pp 475–478 (2008)*

## UCST-Type Cononsolvency Behavior of Poly(2-methacryloyloxyethyl phosphorylcholine) in the Mixture of Water and Ethanol

Poly(2-methacryloyloxyethyl phosphorylcholine) is known to be soluble in pure water and ethanol, but insoluble in the mixture of water and ethanol, that is, have cononsolvency to water and ethanol. The cononsolvency was also observed to water and 1-propanol or 2-propanol, and the turbid solution got clear by heating these solutions. This UCST-type cononsolvency behavior was investigated by turbimetry and dynamic light scattering.



Y. MATSUDA, M. KOBAYASHI, M. ANNAKA,  
K. ISHIHARA, and A. TAKAHARA  
*Vol. 40, No. 5, pp 479–483 (2008)*