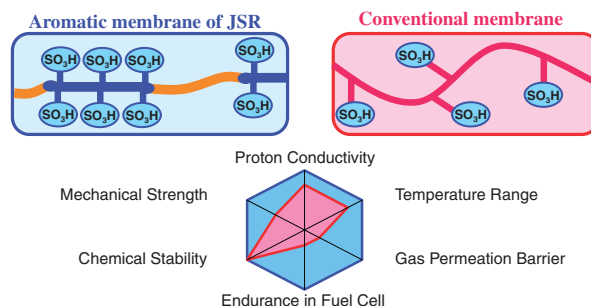


AWARD ACCOUNTS

SPSJ Award Accounts

Development of Aromatic Polymer Electrolyte Membrane with High Conductivity and Durability for Fuel Cell

Novel proton conductive membranes have been prepared from sulfonated aromatic polymers. They show superior mechanical strength and higher proton conductivity compared with conventional perfluorosulfonic acid membranes. A microphase-separated morphology of the polymer contributes significantly to its improved endurance upon current generation, providing excellent engine performance of the fuel cell vehicles in the temperature range from  $-20$  to  $+95$  °C. A manufacturing in the semi-industrial scale is established. This technology has been officially approved for the extension through the public road examination.



K. GOTO, I. ROZHANSKII, Y. YAMAKAWA,  
T. OTSUKI, and Y. NAITO  
Vol. 41, No. 2, pp 95–104 (2009)

SHORT COMMUNICATION

Polymerization of 1,3-Dienes Containing Functional Groups 6: Unexpected Collapse of Monomer Structure in the Anionic Polymerization of 2-Ethoxymethyl-1,3-butadiene

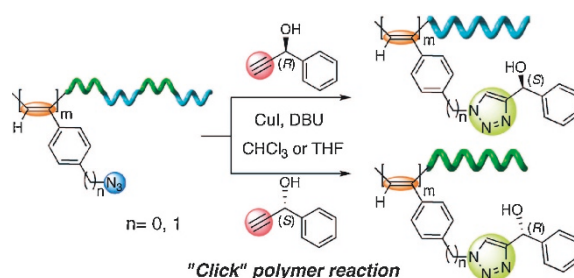
Anionic polymerization of 2-ethoxymethyl-1,3-butadiene (**1**) was carried out under various conditions. No polymeric material was obtained when *sec*-BuLi or potassium naphthalenide was used as an initiator. Polystyrene having terminal dienyl function was obtained by the  $S_N2'$  type reaction of polystyryllithium with **1** accompanied by the elimination of less basic ethoxide anion.



K. TAKENAKA, Y. AKAGAWA, H. TAKESHITA,  
M. MIYA, and T. SHIOMI  
Vol. 41, No. 2, pp 106–107 (2009)

Helix Formation of Poly(phenylacetylene)s Bearing Azide Groups through Click Polymer Reaction with Optically Active Acetylenes

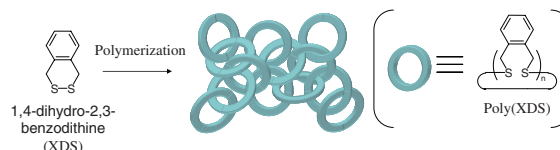
A facile method to prepare optically active helical poly(phenylacetylene)s *via* the click polymer reaction of optically inactive azide-bound poly(phenylacetylene)s with chiral acetylenes has been developed. The resulting poly(phenylacetylene)s formed a preferred-handed helical conformation induced by the covalently bonded chiral triazole units and exhibited induced circular dichroisms whose Cotton effect signs can be used to sense the chirality of the chiral acetylenes.



K. ITOMI, S. KOBAYASHI, K. MORINO,  
H. IIDA, and E. YASHIMA  
Vol. 41, No. 2, pp 108–109 (2009)

### Ring-Opening Polymerization of Aromatic 6-Membered Cyclic Disulfide and Characterization of the Polymer

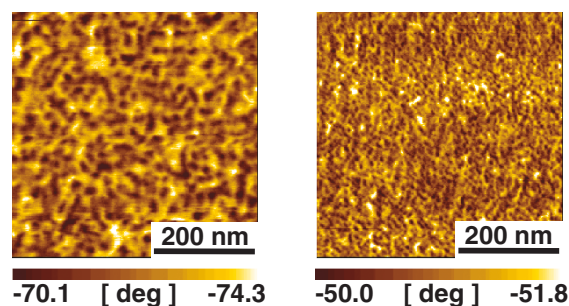
The polymerization of XDS proceeded at reaction temperatures above the melting points of XDS to give high molecular weight polymers. The polymer was found to have cyclic structure. From dynamic viscoelastic measurements, poly(XDS) showed a rubbery plateau under the molten state. The difference in solubility between cyclic poly(XDS) and linear poly(XDS-XDT) was also observed. From the polymer characterizations, it may be concluded that the poly(XDS) obtained from thermal ring-opening polymerization of XDS includes a polycatenane structure.



H. ISHIDA, A. KISANUKI, and K. ENDO  
*Vol. 41, No. 2, pp 110–117 (2009)*

### The Microphase-separated Structure of Polyurethane Bulk and Thin Films

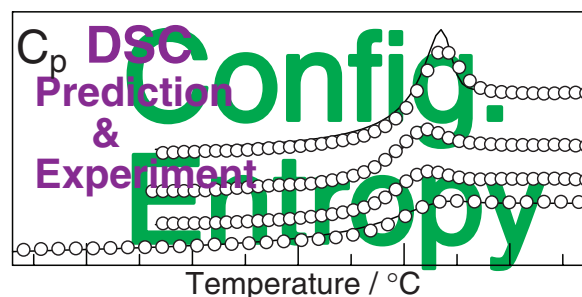
The microphase-separated structure of polyurethane bulk and thin films were investigated using atomic force microscopy (AFM). The structure of bulk was strongly dependent on hard segment content and exhibited various types of the microphase-separated structure. (See atomic force microscopic phase images for bulk sample.) In contrast, for the thin films, film thickness is an important factor to govern the structure. Interdomain spacing decreased with decreasing with film thickness.



K. KOJIO, S. KUGUMIYA, Y. UCHIBA,  
Y. NISHINO, and M. FURUKAWA  
*Vol. 41, No. 2, pp 118–124 (2009)*

### Enthalpy Relaxation of Liquid Crystalline Polymer with Cyanobiphenyl Group in the Side Chain: Analysis based on Configurational Entropy Model with the AG Expression

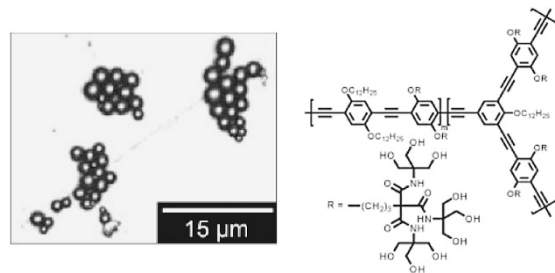
The enthalpy relaxation of poly(cyanobiphenyl hexylacrylate) has been studied by differential scanning calorimetry. The experimental results of the heat capacity were compared with the prediction of a phenomenological model for the process of structural relaxation based on the configurational entropy and the relaxation time expressed by Adam-Gibbs equation. As the measure of structural relaxation upon the isothermal ageing, the value of relaxation function is considered, which estimates the departure from the equilibrium.



Y. TANAKA  
*Vol. 41, No. 2, pp 125–131 (2009)*

### Conjugated Polymer Gels with Dendritic Hydrophilic Side Chains

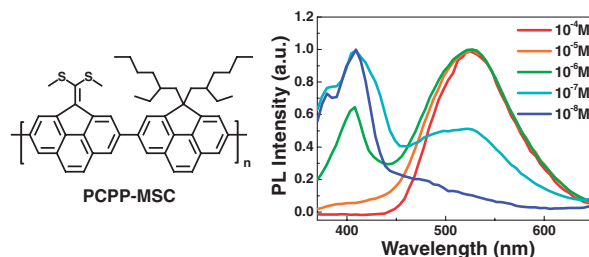
The poly(*p*-phenylene ethynylene) gels with hydrophilic side chains have been prepared by a Pd-catalyzed Sonogashira cross-coupling reaction in aqueous emulsion, and the following conversion of ester groups with tris(hydroxymethyl)amino-methane. The synthesized conjugated polymer gels exhibited high fluorescence and spherical particles. The size distribution of the water-swollen particles is relatively narrow with an average diameter of 0.90 μm. The synthesized particles showed fluorescence and volume changes in response to various solvent compositions.



N. ADACHI, Y. TATEWAKI,  
H. SHIRAI, and M. KIMURA  
*Vol. 41, No. 2, pp 132–137 (2009)*

### Synthesis and Characterization of Novel Conjugated Polymer with 4*H*-Cyclopenta[*def*]phenanthrene and the Sulfanyl Group

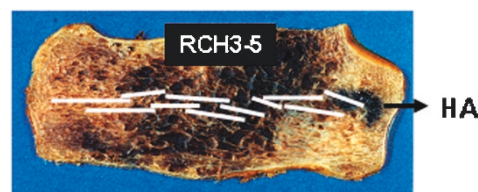
A phenanthrene-based polymer PCPP-MSC, one of the novel 4*H*-cyclopenta[*def*]phenanthrene (CPP) derivatives with bis-methylsulfanyl-methylene unit, shows two PL emission peaks in solution. By an intermolecular interaction between the cyclopenta-phenanthrene segment and the methylsulfanylmethylene unit, the emission peaks of PCPP-MSC were changed according to the concentration of PCPP-MSC.



S. SONG, Y. JIN, S. H. KIM,  
J. H. KIM, K. LEE, and H. SUH  
*Vol. 41, No. 2, pp 138–145 (2009)*

### Orientalional Distribution of Collagen Fibers in the Horizontal Plane of Human Adult Calcaneus

Orientalional distribution of collagen fibers determined using Osaki's microwave method for slice samples (RCH3-5) cut in the horizontal plane of the right human calcaneus bone. The length and inclination of the line represents the net degree of fiber orientation and the direction of fiber orientation, respectively. HA is defined as the direction from the heel to anterior ends.

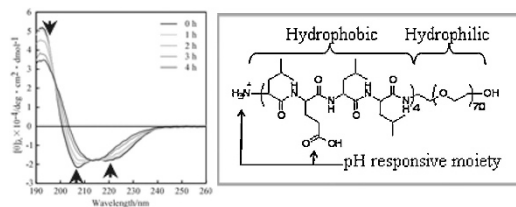


S. OSAKI, K. OHUCHI, S. KIKUCHI, Y. TOHNO,  
S. TOHNO, and Y. TAKAKURA  
*Vol. 41, No. 2, pp 146–152 (2009)*

NOTE

**Aggregation Induced  $\alpha$ -Helix/ $\beta$ -Sheet Transition of the Poly(ethylene glycol)-attached Peptide**

A PEG attached peptide having abundant leucine and glutamic acid as pH responsive residues showed  $\alpha$ -helix/ $\beta$ -sheet transition. The PEGylated peptide once aggregate to form hydrophobic domain depend on the amphiphilicity. The pH responsiveness of *N*-terminus amino group in the formed hydrophobic domain effectively had influence on the appearance of the secondary structural transition.



M. TANAKA, S. ABIKO, T. KOGA,  
N. KOSHIKAWA, and T. KINOSHITA  
*Vol. 41, No. 2, pp 153–156 (2009)*