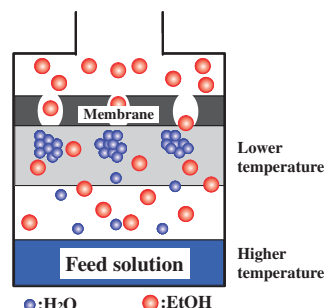


AWARD ACCOUNTS

SPSJ Mitsubishi Chemical Award Accounts

Structural Design of Polymer Membranes for Concentration of Bio-ethanol

Porous poly(dimethylsiloxane) (PDMS) membranes for the concentration of aqueous solutions of dilute bioethanol were applied to a temperature-difference controlled evaporation method. When the temperature of feed solution was kept at constant and the temperature of membrane surroundings was changed, with decreasing temperature of the membrane surroundings the ethanol/water selectivity increased remarkably. The ethanol/water selectivity of a porous PDMS membrane was almost equal to that of a dense PDMS membrane but the permeation rate of the former was higher by three orders of magnitude than that of the latter.

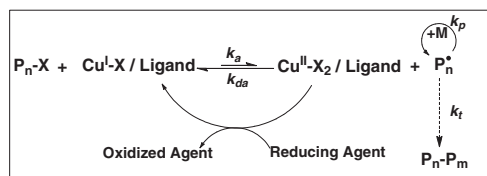


T. URAGAMI  
Vol. 40, No. 6, pp 485–494 (2008)

SHORT COMMUNICATION

ARGET ATRP Synthesis of Thermally Responsive Polymers with Oligo(ethylene oxide) Units

Atom transfer radical polymerization (ATRP) of di(ethylene glycol) methyl ether methacrylate (MEO<sub>2</sub>MA) was performed in the presence of limited air and with a very small (typically ppm) amount of copper catalyst together with appropriate reducing agent. This simple new method to prepare thermally responsive materials does not require any special equipment and can be carried out in vials without deoxygenation.

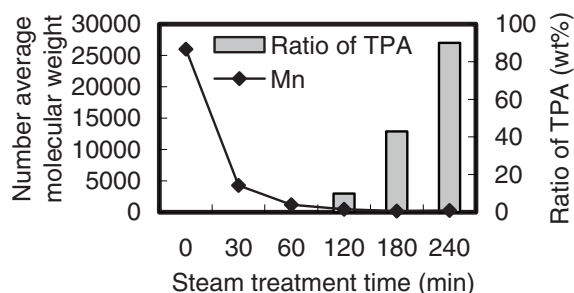


S. YAMAMOTO and K. MATYJASZEWSKI  
Vol. 40, No. 6, pp 496–497 (2008)

REGULAR ARTICLE

Recycling of Polyethylene Terephthalate Using High-pressure Steam Treatment

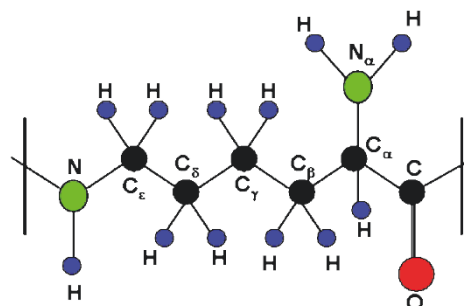
In this experiment, polyethylene terephthalate was decomposed into fine particles during the high-pressure steam treatment at 1.6 MPa without crushing or using acidic or alkaline catalysts and solvents. PET was decomposed from the surface by the high-pressure steam. Additionally, the molecular weight of PET gradually decreased to an oligomer with increasing high-pressure steam treatment time, and then further reduced to a monomer.



A. NORITAKE, M. HORI,  
M. SHIGEMATSU, and M. TANAHASHI  
Vol. 40, No. 6, pp 498–502 (2008)

### Phonon Dispersion and Heat Capacity in Microbial Poly( $\epsilon$ -L-lysine)(M- $\epsilon$ -PL)

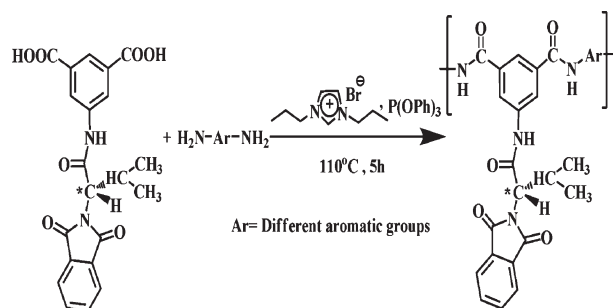
Microbial poly( $\epsilon$ -L-lysine)(M- $\epsilon$ -PL) is naturally occurring bio-material, which is water soluble, biodegradable, edible and non-toxic towards humans and environment. Normal mode analysis including phonon dispersion has been performed to understand completely the vibrational spectra of this polymer. Various characteristic features of the dispersion curves have been reported. The heat capacity is calculated as a function of temperature *via* density-of-states in the range 1–450 K.



M. SINGH, A. K. MISHRA, N. K. MISRA, P. TANDON, K.-K. KUNIMOTO, and V. D. GUPTA  
*Vol. 40, No. 6, pp 503–512 (2008)*

### Room Temperature Ionic Liquids as Replacements for Organic Solvents: Direct Preparation of Wholly Aromatic Polyamides Containing Phthalimide and S-valine Moieties

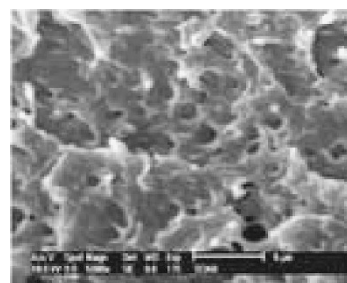
Direct polyamidation of 5-(2-phthalimidyl-3-methylbutanoyl-amino)isophthalic acid containing S-valine and phthalimide groups with various aromatic diamines were carried out in ionic liquids in the presence of triphenyl phosphite. Ionic liquids are non volatile and non toxic, therefore, this process is a green method for polymerization. The resulting novel wholly aromatic optically active polyamides with inherent viscosities ranging from 0.35–0.71 dLg<sup>-1</sup>, were obtained in good yields. The introduction of pendent bulky groups along the polymer backbone increased the solubility property.



S. MALLAKPOUR and M. KOLAHDOOZAN  
*Vol. 40, No. 6, pp 513–519 (2008)*

### Graft Reaction of Styrene-acrylonitrile onto Metallocene-Based Polyethylene-Octene Elastomer and its Toughening Effect on SAN

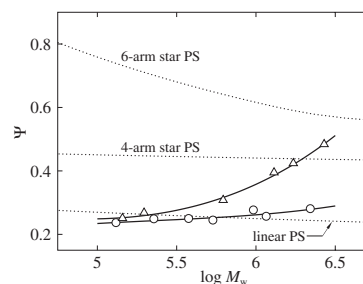
Polyethylene-Octene Elastomer-graft-styrene/acrylonitrile (POE-g-SAN) was synthesized by grafting St and An onto POE. The reaction was carried out in toluene using benzyl peroxide as initiator at 75 °C. The effects of reaction conditions were studied. POE-g-SAN was characterized by FT/IR, <sup>1</sup>H NMR and DSC. According to the research on mechanical properties of the SAN/POE blend, a remarkable toughening effect of POE-g-SAN on SAN resin was found.



Y. LI, L. WANG, J. DAI, and A. ZHANG  
*Vol. 40, No. 6, pp 520–527 (2008)*

### Primary Structure of Poly(*N*-isopropylacrylamide) Synthesized by Radical Polymerization. Effects of Polymerization Solvents

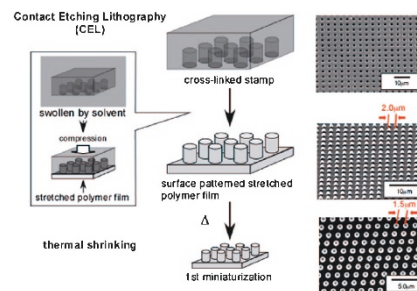
The interpenetration function  $\Psi$  in methanol at 25.0 °C for poly(*N*-isopropylacrylamide) (PNIPA) synthesized in benzene ( $\Delta$ ) becomes remarkably larger than that for linear polystyrene (PS) in benzene at 25.0 °C as the weight-average molecular weight  $M_w$  is increased, while that for PNIPA synthesized in *tert*-butanol ( $\circ$ ) becomes slightly larger than that for the linear PS. The result indicates that the number of branch points is larger in the former PNIPA than in the latter.



T. KAWAGUCHI, Y. KOJIMA, M. OSA, and T. YOSHIZAKI  
*Vol. 40, No. 6, pp 528–533 (2008)*

### Miniaturization of Surface Patterns by Combination of Contact Etching Lithography and Multi-step Shrinking of Stretched Polymer Films

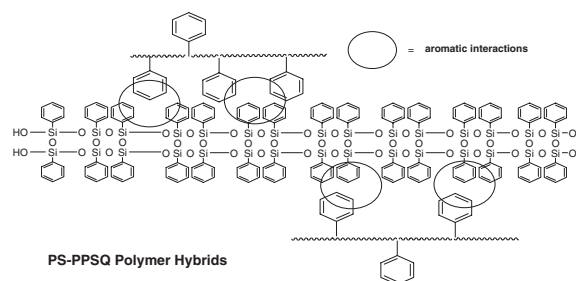
We demonstrate here a novel pattern transferring method named “Contact Etching Lithography” onto stretched polymer films by using a solvent-swollen polydimethylsiloxane (PDMS) molds as a template. Furthermore, the transferred patterns can be miniaturized by thermal shrinking of the patterned stretched polymer film.



H. YABU and M. SHIMOMURA  
*Vol. 40, No. 6, pp 534–537 (2008)*

### Organic-Inorganic Polymer Hybrids of Polystyrene with Ladderlike Polyphenylsilsesquioxanes

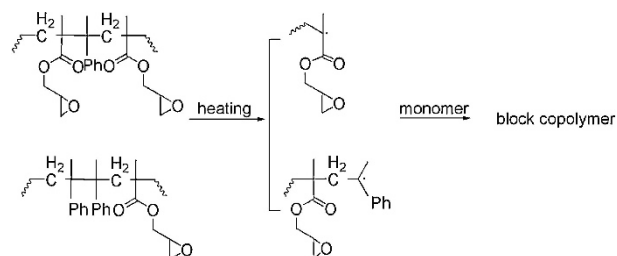
Polymer hybrids from ladderlike PPSQ with PS showed that the homogeneity gradually increased as the weight ratio of PS to PPSQ increased. Thus, physical bonding, namely aromatic ( $\pi$ - $\pi$ ) interactions between phenyl groups of PS and ladderlike PPSQ played a critical role for the homogeneity and transparency of polymer hybrids. The obtained homogeneous and transparent hybrid materials could be dissolved in solvents and cast again without any separation because of physical bonding between PS and ladderlike PPSQ.



Y.-C. AN, N.-Y. JANG, S. W. LEE, J.-H. LIM, and K.-M. KIM  
*Vol. 40, No. 6, pp 538–542 (2008)*

### Block Copolymers Prepared by Free Radical Polymerization Using $\alpha$ -Methylstyrene-containing Precopolymer as Macroinitiator

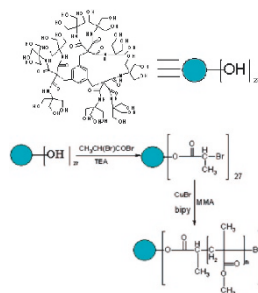
A novel way to prepare block copolymers is presented. Copolymers (PAG) of  $\alpha$ -methylstyrene (AMS) and glycidyl methacrylate (GMA) acted as macroinitiators when heated with other monomers. On the basis of this finding, a series of block copolymers, PAG-*block*-PMMA ( $M_n = 63100$  g/mol,  $M_w/M_n = 1.77$ ) and PAG-*block*-PSt ( $M_n = 44700$  g/mol,  $M_w/M_n = 1.63$ ), were prepared. This simple method is expected to be applied to kinds of monomers to prepare highly functional copolymers with unique structures.



S. JIANG, J. DENG, and W. YANG  
*Vol. 40, No. 6, pp 543–548 (2008)*

### Synthesis of Core-shell Star Poly(methyl methacrylate) with Benzene Arborol Core by Atom Transfer Radical Polymerization

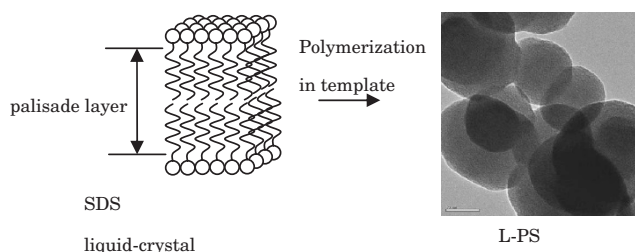
Core-shell type star poly(methyl methacrylate) (PMMA) with benzene arborol core and linear PMMA shell having controlled chain lengths and numbers average molecular weights were synthesized by atom transfer radical polymerization (ATRP) of methyl methacrylate (MMA) in the presence of multifunctional benzene arborol macroinitiator.



H. ZHANG, Z. HUANG, and Q. ZHANG  
*Vol. 40, No. 6, pp 549–553 (2008)*

### Novel Thermodynamic Property and Molecular Chain of Polystyrene Nano-Platelet

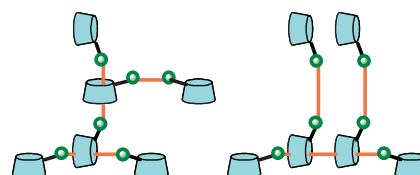
A novel lamellar polymer nanomaterial-polystyrene nano-platelet (L-PS) was prepared by free-radical polymerization in surfactant (sodium dodecyl sulfate, SDS) liquid-crystal template. The L-PS had novel DSC result, and it could form ordered structure under some conditions. Considering its especial polymerized template, we thought there were many molecular chain segments which had the same orientation and length on the thickness of L-PS. L-PS should be a novel nano-polymer which had never been found before.



J. J. GUO and X. Y. LI  
*Vol. 40, No. 6, pp 554–558 (2008)*

### Topologically Linked Branch Polymers from Mono-amino-cyclodextrins and Polyethylene Glycol Dicarboxylic Acid

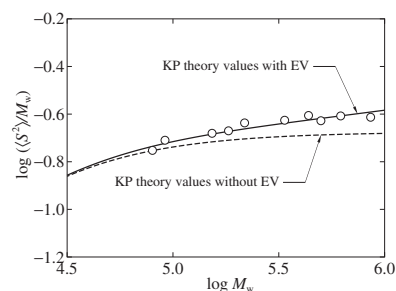
Topologically linked branch polymers were prepared by condensation of mono-6-deoxy-mono-6-aminocyclodextrin ( $\text{NH}_2\alpha\text{CD}$ ,  $\text{NH}_2\beta\text{CD}$ , and  $\text{NH}_2\gamma\text{CD}$ ) with polyethylene glycol dicarboxylic acid (PEGdiCOOH). Some  $\text{NH}_2\text{CD}$  molecules and PEGdiCOOH chains form inclusion complexes prior to condensation reaction. Since these complexes act as multifunctional monomers, the condensation product contains topologically linked branch polymers, in which CD rings act both as a topological cross link and as a capping site to prevent dethreading of CD molecules from PEG chains.



K. TAMURA, N. OYA, K. HATANAKA, and N. YOSHIE  
*Vol. 40, No. 6, pp 559–565 (2008)*

### Mean-Square Radius of Gyration and Second Virial Coefficient of Poly(diisopropyl fumarate) in Dilute Solution

The mean-square radius of gyration ( $\langle S^2 \rangle$ ) ( $\circ$ , in  $\text{\AA}^2$ ) and second virial coefficient were determined from light scattering measurements for poly(diisopropyl fumarate) with the fraction of racemo diads  $f_r = 0.22$  in a range of weight-average molecular weight  $M_w$  from  $4.02 \times 10^4$  to  $8.59 \times 10^5$  in tetrahydrofuran at  $30.0^\circ\text{C}$ , and are simultaneously analyzed on the basis of the Kratky–Porod (KP) wormlike chain with excluded volume (EV).

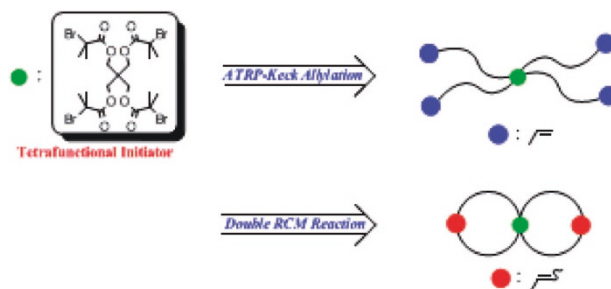


M. NAKATSUJI, M. HYAKUTAKE, M. OSA, and T. YOSHIZAKI  
*Vol. 40, No. 6, pp 566–571 (2008)*

## NOTE

### ATRP-RCM Synthesis of 8-Shaped Poly(methyl acrylate) Using a 4-Armed Star Telechelics

A dicyclic, 8-shaped poly(methyl acrylate), PMA, has been synthesized through double metathesis polymer cyclization (MPC) of a 4-armed star polymer precursor having allyl groups at each chain ends, prepared through the atom transfer radical polymerization (ATRP) using a tetrafunctional initiator and subsequent end-capping reaction with allyltributyltin. The double ring-closing metathesis (RCM) reaction took place under dilution (0.4 g/L) in the presence of Grubbs catalyst.



S. HAYASHI, K. ADACHI, and Y. TEZUKA  
*Vol. 40, No. 6, pp 572–576 (2008)*