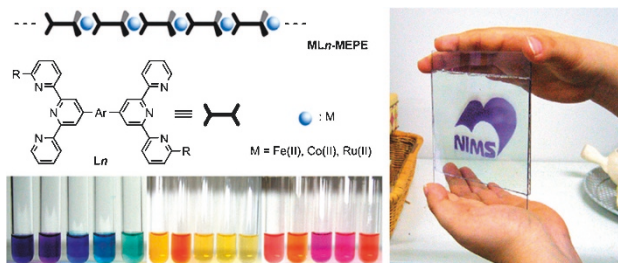


AWARD ACCOUNTS

SPSJ Hitachi Chemical Award Accounts

Electrochromic Organic–Metallic Hybrid Polymers: Fundamentals and Device Applications

Organic–metallic hybrid polymers consisting of bis(terpyridine)s and metal ions such as Fe(II) or Ru(II) have specific colors based on metal-to-ligand charge transfer (MLCT) absorption. Interestingly, polymer films have excellent electrochromic properties. Various colors can be observed by changing the metal species and/or by modifying the organic ligands used to synthesize the polymers. Multicolor electrochromic changes occur upon the introduction of two types of metal ions into the polymer. Electrochromic solid-state devices have been successfully fabricated by using these polymers.

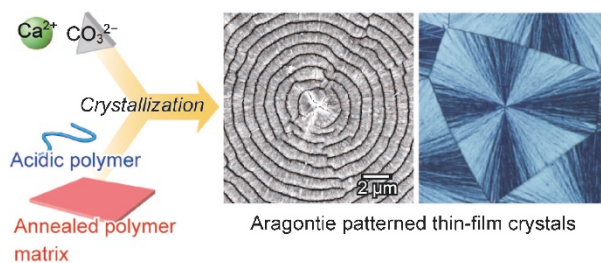


M. HIGUCHI
Vol. 41, No. 7, pp 511–520 (2009)

SHORT COMMUNICATION

Calcium Carbonate/Polymer Thin-Film Hybrids: Induction of the Formation of Patterned Aragonite Crystals by Thermal Treatment of a Polymer Matrix

We prepared aragonite CaCO₃/polymer hybrids with regularly patterned structures through self-organization processes. The CaCO₃ film crystals with the surface-relief structures were formed on a poly[(vinyl alcohol)-*co*-(vinyl acetate)] matrix in the presence of a soluble acidic additive. The morphologies and polymorphs of the CaCO₃ films were successfully modified by the thermal treatment of the polymer matrix. The approach reported here may have great potentials to control the complex morphologies of a wide variety of inorganic crystalline materials.



T. SAKAMOTO, A. OICHI, T. NISHIMURA,
A. SUGAWARA, and T. KATO
Vol. 41, No. 7, pp 522–523 (2009)

Nonvolatile and Shape-Memorized Bacterial Cellulose Gels Swollen by Poly(ethylene glycol)

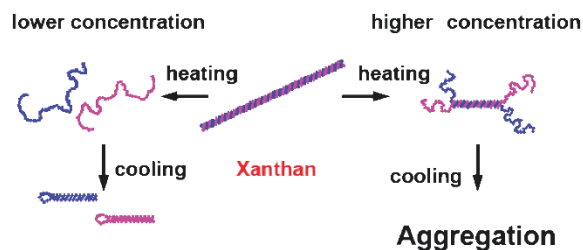
We found that bacterial cellulose (BC) gels swollen in poly(ethylene glycol) (PEG) are not only hard to dry but also show the shape-memory properties due to the thermo-responsibility of the gels. The BC/PEG gels change the transparency/turbidity and elasticity, depending on the temperature. The transient temperature can be controlled by the molecular weight and composition of PEG.



Y. NUMATA, K. MUROMOTO, H. FURUKAWA,
J. P. GONG, K. TAJIMA, and M. MUNEKATA
Vol. 41, No. 7, pp 524–525 (2009)

Thermal Denaturation, Renaturation, and Aggregation of a Double-Helical Polysaccharide Xanthan in Aqueous Solution

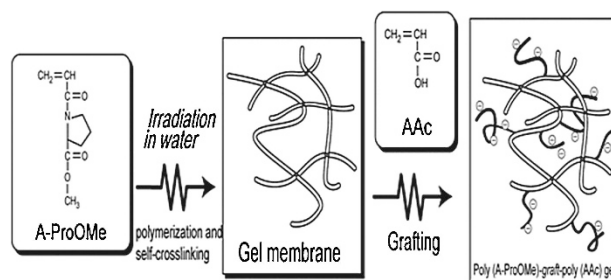
Xanthan solutions prepared in different denaturation and renaturation conditions were studied by SEC-MALS. At low xanthan concentrations, the xanthan double helix dissociates into two single chains in the denaturation, and each single chain reconstructs the intramolecular double helical structure with a hairpin loop in the renaturation. At higher concentrations, the double helix does not thermally dissociate, and the denatured xanthan dimer aggregates in the renaturation.



Y. MATSUDA, Y. BIYAJIMA, and T. SATO
Vol. 41, No. 7, pp 526–532 (2009)

Thermo- and pH-Responsive Poly(A-ProOMe)-graft-poly(AAc) Membrane for Selective Separation of Metal Ions

Thermo- and pH-responsive gel membranes were prepared by γ -ray grafting of poly(acrylic acid) onto poly(acryloyl-L-proline methyl ester). Using 15% AAc grafted membranes, the permeation constants of Li ions are higher than those of Co and Ni ions in a pH 6.0 at 30 °C. The distributions of Co and Ni ions in the microscopic structures clearly show that the carboxyl groups grafted onto the thermo-response gel membrane plays a decisive role in the superior selective permeation of a Li ion.



S. HASEGAWA, H. OHASHI, Y. MAEKAWA,
R. KATAKAI, and M. YOSHIDA
Vol. 41, No. 7, pp 533–540 (2009)

Preparation and Properties of Siloxane/Epoxy Organic-Inorganic Hybrid Thin Films, Self-Standing Films, and Bulk Bodies

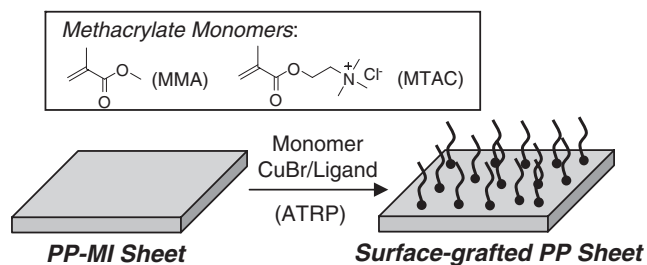
Polysiloxane/epoxy hybrids were prepared by the reaction of poly-3-*N*-2-aminoethylaminopropylpolysilsesquioxane with bisphenol-A diglycidyl ether. Transparent and homogeneous thin films, self-standing-films, and bulk bodies were obtained when equivalent mixing was achieved. These films were flexible and showed a maximum Young's modulus of 322.6 MPa.



T. GUNJI, S. ITAGAKI, T. KAJIWARA,
Y. ABE, T. HATAKEYAMA, and R. AOKI
Vol. 41, No. 7, pp 541–546 (2009)

Surface Modification of Polypropylene Molded Sheets by Means of Surface-Initiated ATRP of Methacrylates

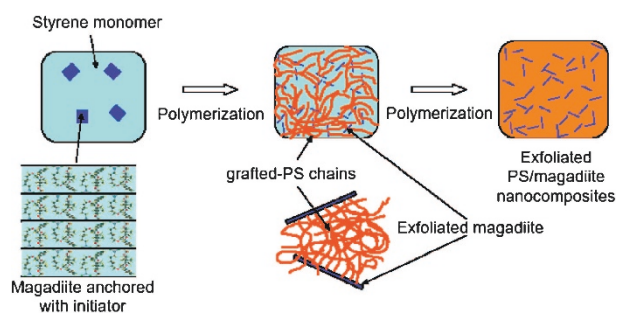
Surface-initiated ATRP of two kinds of methacrylate monomers was carried on the surface of structurally well-defined polypropylene-macroinitiator molded sheets. It has clearly been revealed that a high graft density polymer brush of PMMA was formed as a thin layer on the sheet surface. Furthermore, the grafting of highly wettable poly(methacrylate)s to the PP sheets drastically modified their wettability with no visual and mechanical changes, and also showed extremely high antibacterial property.



T. MATSUGI, J. SAITO, N. KAWAHARA, S. MATSUO, H. KANEKO, N. KASHIWA, M. KOBAYASHI, and A. TAKAHARA
Vol. 41, No. 7, pp 547–554 (2009)

Thermal Degradation Behavior of Polystyrene/Magadiite Nanocomposites prepared by Surface-Initiated Nitroxide-Mediated Radical Polymerization

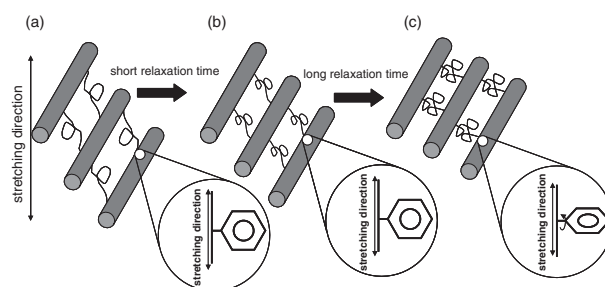
Exfoliated PS/magadiite nanocomposites were successfully prepared by means of *in situ* nitroxide-mediated radical polymerization from the initiator-immobilized magadiite interlayer surface (Figure). The suppression effect on thermal degradation was enhanced by the delaminated dispersion of magadiite in PS matrices. In addition, their final residues after TGA remained as substantially rigid solids, maintaining their shape. These results suggest that the nanocomposites will offer high flame-retardant performance.



H. YUKUTAKE, M. KOBAYASHI, H. OTSUKA, and A. TAKAHARA
Vol. 41, No. 7, pp 555–561 (2009)

Orientation Relaxation of Triblock Copolymer with Cylindrical Microdomain by *in situ* Stress-Birefringence Measurements

We found characteristic orientation relaxation behavior of triblock copolymer with cylindrical microdomains of polystyrene by simultaneous measurements of stress and birefringence, and SAXS measurements. It is suggested that the orientation relaxation of the rubbery segments occurs at short relaxation time, and then the orientation relaxation of the PS segments in the microdomains occurs associating with the conformational change of the phenylene side group at long relaxation time at high temperature while the orientation of the cylindrical domain is not changed.



K. SHIMIZU and H. SAITO
Vol. 41, No. 7, pp 562–567 (2009)