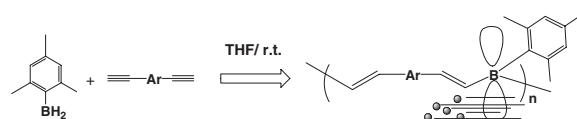


REVIEW ARTICLE

π -Conjugated Organoboron Polymers *via* the Vacant *p*-Orbital of the Boron Atom

Methodologies for the synthesis of organoboron π -conjugated polymers are reviewed. Efficient extension of π -conjugation through the vacant *p*-orbital of the boron atom has been observed in a series of organoboron polymers prepared by hydroboration polymerization. Because of the unusual electronic state of the organoboron π -electron systems, intriguing physical properties have been observed for these systems. In addition to boration polymerization, transition metal catalyzed cross-coupling polymerization and polycondensation *via* metal exchange have been found convenient for the preparation of organoboron π -conjugated systems.

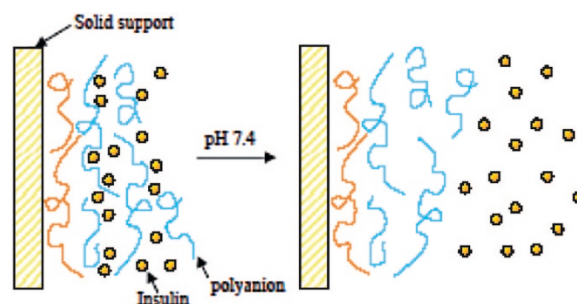


N. MATSUMI and Y. CHUJO
Vol. 40, No. 2, pp 77–89 (2008)

SHORT COMMUNICATION

Preparation of Layer-by-layer Thin Films Containing Insulin and its pH-Sensitive Decomposition

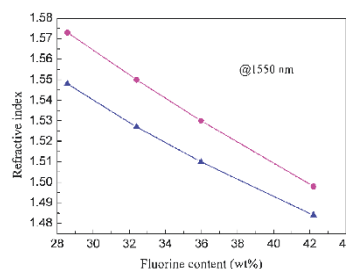
We have demonstrated that pH-sensitive LbL thin films containing insulin can be prepared by an alternate deposition of insulin and polyanions such as poly(vinyl sulfate), dextran sulfate, and poly(acrylic acid) at pH 3.0 and the films are decomposed at pH 7.4. Thus, insulin can be released from the LbL films at the neutral pH. The insulin-containing LbL films may be useful for developing oral formulations of insulin.



K. YOSHIDA, H. SATO, S. TAKAHASHI, and J. ANZAI
Vol. 40, No. 2, pp 90–91 (2008)

Fluorinated Poly(phthalazinone ether)s with Tunable Refractive Index: Synthesis, Characterization and Optical Properties

A series of fluorinated poly(phthalazinone ether)s have been prepared by a modified synthetic procedure. The polymers exhibited excellent solubility, high thermal stability and good optical properties. By adjusting the feed ratio of the reactants, the refractive indices of TE and TM modes (at 1550 nm) could be controlled in the range of 1.573–1.498 and 1.548–1.484, respectively.

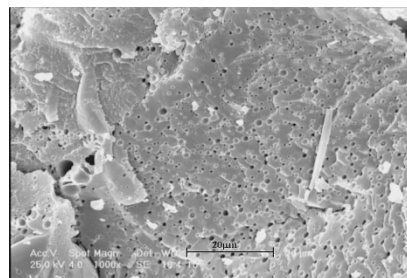


Relationship between the refractive index and fluorine content (wt %) of FPPEs. (●) at TE mode. (▲) at TM mode.

Y. SONG, G. LI, J. WANG, Q. SUN, X. JIAN,
J. TENG, and H. ZHANG
Vol. 40, No. 2, pp 92–93 (2008)

Salt- and pH-Resisting Collagen-based Highly Porous Hydrogel

A novel approach was developed to prepare a highly porous hydrogel with superior salt- and pH-resisting properties. Experimental results indicate that the hydrogel has an absorbency of 360 and 73–82 g/g for distilled water and saline solutions, respectively. Water absorbency slightly changes from pH 3 to 8 and interestingly is more than that in distilled water (~ 500 g/g).

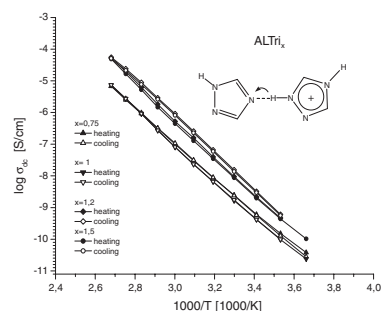


SEM photographs of optimized sample: 1000 \times .

A. POURJAVADI, M. KURDTABAR, and H. GHASEMZADEH
Vol. 40, No. 2, pp 94–103 (2008)

Preparation and Proton Conductivity of Polymer Electrolytes Based on Alginic Acid and 1,2,4-Triazole

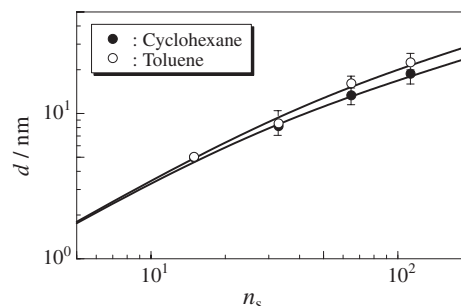
The synthesis, thermal and proton conducting properties of the biopolymer-heterocycle electrolytes were investigated. Alginic acid, AL was employed as a host matrix and triazole was used as the proton solvent. Transparent, homogeneous and thin films of ALTri_x electrolytes were obtained when the dopant ratio x was ranged from 0.5 to 1.5. Polymer electrolytes were characterized by FT-IR, TG, DSC and XRD methods. Proton conductivity of ALTri_{1.5} is approximately 0.1 mS/cm at 100 °C.



Ş. T. GÜNDAY and A. BOZKURT
Vol. 40, No. 2, pp 104–108 (2008)

Dilute-Solution Properties of Polystyrene Polymacromonomer Having Side Chains of over 100 Monomeric Units

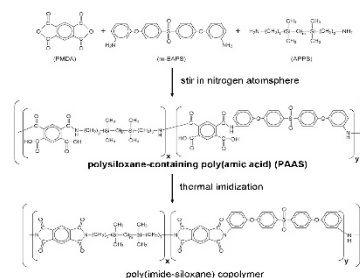
Chain diameter d plotted double-logarithmically against the polymerization degree n_s of side chain for polystyrene polymacromonomers in toluene at 15.0 °C (unfilled circles) and cyclohexane at 34.5 °C (filled circles). Lines show the values calculated for wormlike side chains with λ_s^{-1} (stiffness parameter of side chain) = 6 nm in cyclohexane and 9 nm in toluene. Both λ_s^{-1} values are larger than the stiffness parameter for the linear polystyrene chain (2 nm), suggesting that polymacromonomer side chains are extended by interactions among them.



M. SUGIYAMA, Y. NAKAMURA, and T. NORISUYE
Vol. 40, No. 2, pp 109–115 (2008)

A Straightforward Synthesis and Characterization of a New Poly(imide siloxane)-based Thermoplastic Elastomer

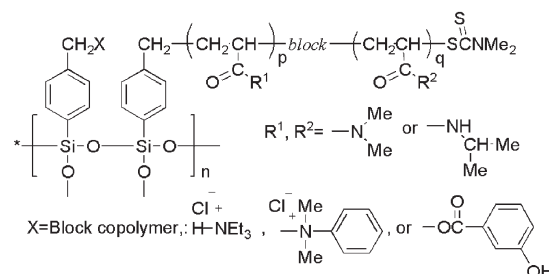
A poly(imide-siloxane)-based, thermostable and recyclable thermoplastic elastomers were prepared from α , ω -bis(3-aminopropyl) polydimethyl siloxane (APPS, $M_n = 859, 1152, 1619$), 2, 2'-bis[4-(3-aminophenoxy)phenyl] sulfone (m-BAPS) and pyromellitic dianhydride (PMDA) by straightforward polycondensation reaction in solution, followed by thermal imidization. The prepared PIS copolymers possess thermoplastic elastomer properties. Two samples (APPS $M_n = 859$, PI content of 15 and 20 wt %) behaved like rubber. Microphase separation is important in characterizing the copolymers.



W.-C. LIAW, J. CHANG-CHIEN, H. KANG,
Y.-L. CHENG, and L.-W. FU
Vol. 40, No. 2, pp 116–125 (2008)

Preparation of Stimuli-responsive Polysilsesquioxane Grafted Block Copolymer of Acrylamide Monomers

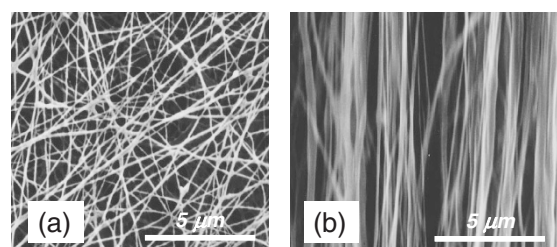
The polysilsesquioxanes (PSQs) having the block copolymer of *N*-isopropylacrylamide and *N,N*-dimethylacrylamide (DMAA), which showed the different sequence and number of the monomer units as the graft chains, were obtained by RAFT process. In addition, through the formation of ester bond and quarternary ammonium salt, phenol, triethylamine, and *N,N*-dimethylaniline groups were introduced into the grafted PSQ, respectively. Next, the behaviors of reversible thermoresponsive aggregation provided by the grafted copolymers and the additional functions by the introduced functional groups were examined.



T. MASUDA, S. YAMAMOTO, O. MORIYA,
M. KASHIO, and T. SUGIZAKI
Vol. 40, No. 2, pp 126–136 (2008)

Production of Bacterial Cellulose with Well Oriented Fibril on PDMS Substrate

Uni-axially oriented fibril of BC gels with improved mechanical toughness has been created by culturing the cells on ridged PDMS/liquid interface. It was found that on a PDMS substrate with a ridge size about the contour length of the bacteria cells, the cells are able to produce BC gels with the highest birefringence (Δn), the highest fracture stress (σ), highest swelling degree (q), the lowest elastic modulus (E), and the thickest BC fibril.

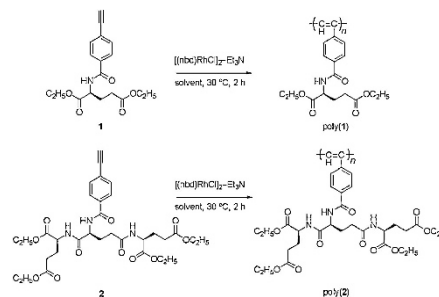


SEM images of BC produced at PDMS/liquid (a) and Ridged PDMS/liquid interface (b).

A. PUTRA, A. KAKUGO, H. FURUKAWA, J. P. GONG,
Y. OSADA, T. UEMURA, and M. YAMAMOTO
Vol. 40, No. 2, pp 137–142 (2008)

Synthesis of Glutamic Acid-based Dendritic Helical Poly(phenylacetylene)s

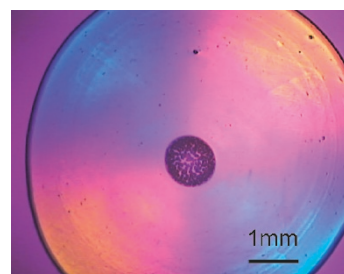
L-Glutamic acid-based novel dendritic phenylacetylene derivatives **1** and **2** were synthesized and polymerized with a rhodium catalyst to afford the corresponding polymers [poly(**1**) and poly(**2**)] with high molecular weights in 83–95% yields. Poly(**1**) formed a helical structure with predominantly one-handed screw sense in DMF, CHCl₃, and MeOH, and poly(**2**) did in DMF. The helical conformation of poly(**1**) and poly(**2**) could be tuned by temperature. Poly(**1**) underwent solvent-driven helix-helix transition in CHCl₃/DMF.



Y. HU, R. LIU, F. SANDA, and T. MASUDA
Vol. 40, No. 2, pp 143–147 (2008)

Self-Assembled Orientation of Polymer Chains in Methylcellulose Gel during Drying Process

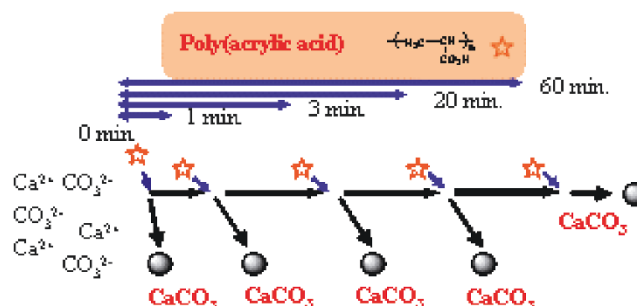
Droplets of physical gel of methylcellulose aqueous solution were dried to form solidified thin films. By selecting an adequate condition, the sample was kept to be in gel state during the drying process. The image of our gel originated solidified thin film showed very similar pattern to those of a single negative spherulite observed by a polarized optical microscope inserted a sensitive color plate. Methylcellulose has an optical uniaxial anisotropy, hence the polymer chains of methylcellulose are arranged on concentric circles.



R. NISHIDA and M. TAKAHASHI
Vol. 40, No. 2, pp 148–153 (2008)

Effect of Molecular Weights of Poly(acrylic acid) on Crystallization of Calcium Carbonate by the Delayed Addition Method

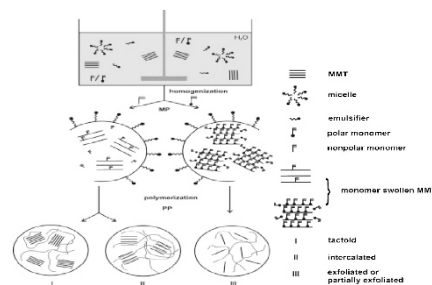
Mineralization of CaCO₃ was studied by varying the molecular weights of poly(acrylic acid) (PAA) as well as by changing the addition time of PAA-Na to an aqueous solution of calcium carbonate at different nucleation stages. Stable vaterite crystals were obtained by delaying the addition of PAA-Na, and the resulting particles were formed by a spherulitic growth mechanism. However, in the initial presence of PAA-Na, amorphous phase, vaterite or calcite products formed by the nano-aggregation or spherulitic growth mechanisms were induced under different conditions.



S.-C. HUANG, K. NAKA, and Y. CHUJO
Vol. 40, No. 2, pp 154–162 (2008)

Kinetics of Styrene and Butyl Acrylate Polymerization in Anionic Microemulsions in Presence of Layered Silicates

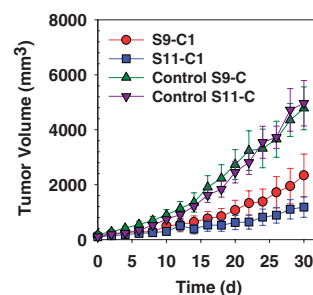
The effect of various layered silicates was studied on kinetics of styrene and butyl acrylate in anionic microemulsion polymerization. The kinetic, colloidal and molecular weight parameters are influenced both by the monomer and layered silicate polarities. The decreasing values of the desorption constants in the presence of clays, demonstrate a decreasing of the probability of the radical exit from particles.



L. FIALOVÁ, I. CAPEK, R. IANCIŞ, M. C. COROBEA,
D. DONESCU, and D. BEREK
Vol. 40, No. 2, pp 163–170 (2008)

In vitro Release and *in vivo* Anti-tumor Efficacy of Doxorubicin from Biodegradable Temperature-sensitive Star-shaped PLGA-PEG Block Copolymer Hydrogel

To assess temperature-sensitive biodegradable 4arm PLGA-PEG hydrogels as a sustained drug-delivery formulation, *in vivo* anti-tumor efficacy was examined by using tumor-bearing mice treated with DXR-loaded/ DXR-free hydrogels. After 1 month, the mice treated with DXR-loaded S11-C1 and DXR-loaded S9-C1 copolymer solutions had remarkably suppressed tumor-volume compared to that of the mice treated with DXR-free copolymer solution. And DXR-loaded S11 hydrogel showed more significant tumor inhibition due to the different hydrophobicity between S9 and S11 copolymers.



S. J. LEE, Y. BAE, K. KATAOKA,
D. KIM, D. S. LEE, and S. C. KIM
Vol. 40, No. 2, pp 171–176 (2008)