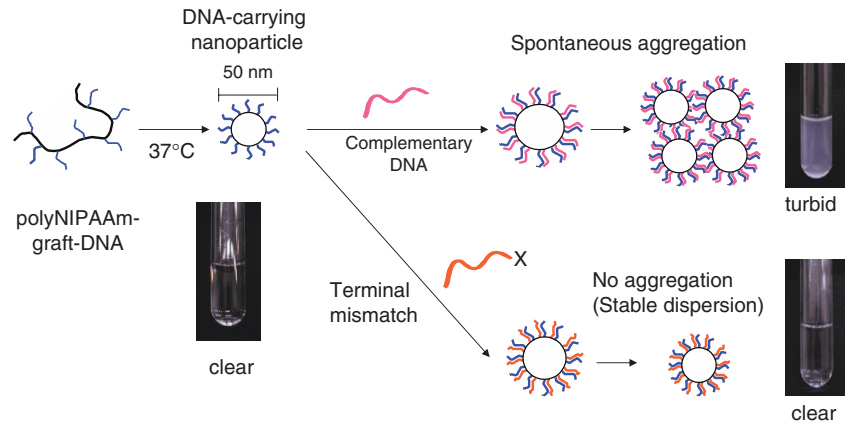


Sequence-Specific Aggregation Behavior of DNA-Carrying Colloidal Nanoparticles Prepared from Poly(*N*-isopropylacrylamide)-graft-Oligodeoxyribonucleotide

M. MAEDA

[Award Accounts: SPSJ Award (2004)]
 Vol. 38, No. 11, pp 1099–1104 (2006)

Graft copolymers consisting of poly(*N*-isopropylacrylamide) as the trunk and single-stranded DNA as branches were prepared to form DNA-carrying nanoparticles above physiological temperature. We found that aggregation of the nanoparticles was induced at relatively high salt concentration (400 mM NaCl) by the hybridization of surface-anchored DNA with full-match complementary DNA. In contrast, single-base mismatches at the distal end stabilized the colloidal dispersion so that the dispersion remained transparent. The phenomenon is applicable to SNP typing when combining with the single-base primer extension reaction.

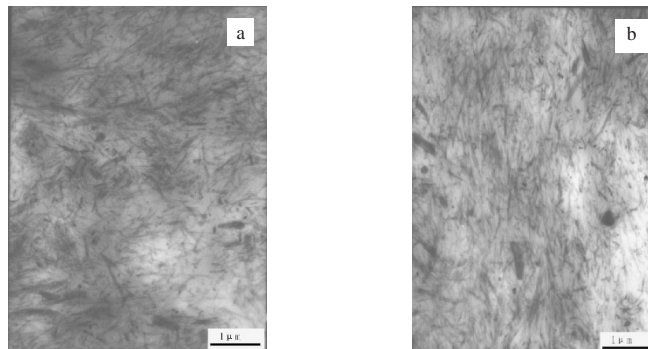


Structure and Properties of Novel Fibril Silicate/Rubber Nanocomposites

M. TIAN, Y. LU, W. LIANG,
 L. CHENG, and L. ZHANG

[Regular Article]
 Vol. 38, No. 11, pp 1105–1113 (2006)

Palygorskite (AT) mineral was selected as a nano-fiber precursor to construct a novel nano-fiber/rubber nanocomposites by using a simple and cost-efficient preparation method. Upon shear force during traditional mechanical mixing, the numerous nano-fibers contained in palygorskite micro-powder were released into rubber matrix. These nanocomposites exhibit stress-strain characteristics that are similar to that of micro-short fiber reinforced rubber, evident anisotropy in mechanical properties, good processing properties, as well as low cost and easily practiced by industry.



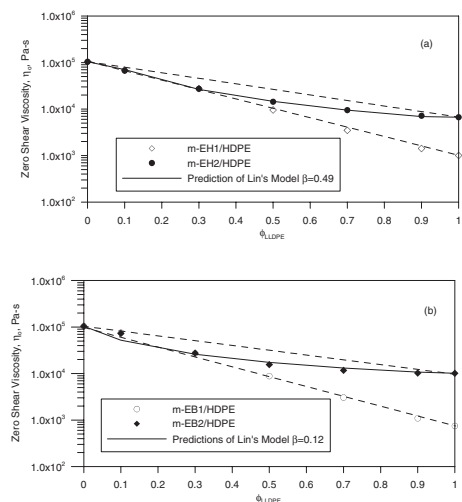
The Figure shows that all the palygorskite particulates almost are separated into numerous fibrils with nano-diameter in rubber matrices such as SBR(a) and NBR(b), using a traditional mechanical mixing technique, combined with an *in situ* modifying method.

Melt Miscibility and Mechanical Properties of Metallocene LLDPE blends with HDPE: Influence of M_w of LLDPE

T. HAMEED and I. A. HUSSEIN

[Regular Article]
 Vol. 38, No. 11, pp 1114–1126 (2006)

Melt rheology of m-LLDPE blended with linear HDPE revealed strong influence of M_w on melt miscibility. Low M_w m-LLDPE/HDPE blends are suggested to be miscible, whereas, viscosity of high M_w m-LLDPE/HDPE blends showed negative deviation behavior suggesting layered morphology of these blends. The DSC results suggest that compatibility in the solid state is independent of M_w and BC. Small strain mechanical properties of these blends were found to be a strong function of blend compatibility and the specific properties of the blend components.



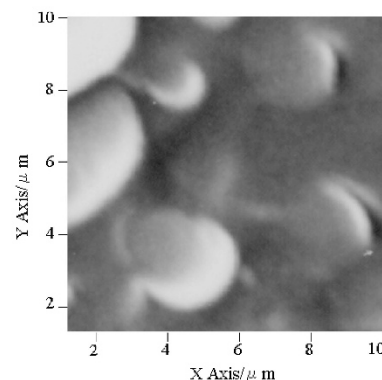
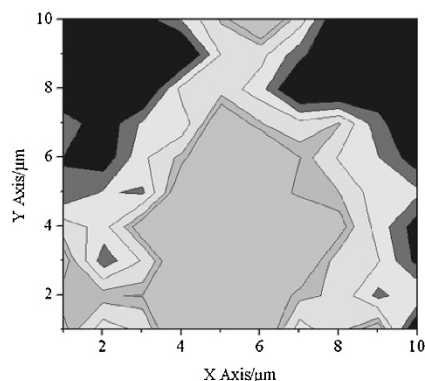
Molecular Structure, Crystallinity and Morphology of Polyethylene/Polypropylene Blends Studied by Raman Mapping, Scanning Electron Microscopy, Wide Angle X-Ray Diffraction, and Differential Scanning Calorimetry

T. FURUKAWA, H. SATO, Y. KITA, K. MATSUKAWA, H. YAMAGUCHI, S. OCHIAI, H. W. SIESLER, and Y. OZAKI

[Regular Article]

Vol. 38, No. 11, pp 1127–1136 (2006)

Raman mapping and SEM images of 80/20 Metallocene polyethylene/polypropylene blend.



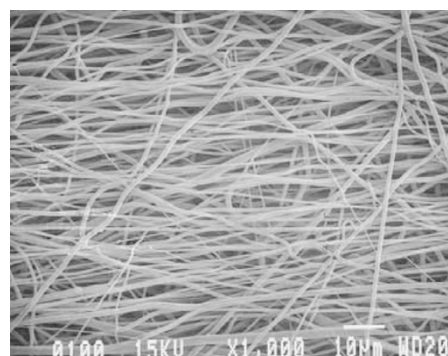
Thermal and Mechanical Characterization of Electrospun Blends of Poly(lactic acid) and Poly(glycolic acid)

L. I. RAMDHANIE, S. R. AUBUCHON, E. D. BOLAND, D. C. KNAPP, C. P. BARNES, D. G. SIMPSON, G. E. WNEK, and G. L. BOWLIN

[Regular Article]

Vol. 38, No. 11, pp 1137–1145 (2006)

Poly(lactic acid) (PLA) and poly(glycolic acid) (PGA) have long been popular polymers in the development of tissue engineering scaffolds due to their biocompatibility, bioabsorbability, and good tensile strength. Electrospinning is an attractive approach for the production of non-woven, nano- to micron-scale fibrous tissue engineering scaffolds of complex geometries. In this study, we characterize electrospun blends of PLA and PGA via scanning electron microscopy (as shown), tensile testing, differential scanning calorimetry, and phase contrast microscopy to gain a better understanding of these blended structures for potential use in biomedical applications.



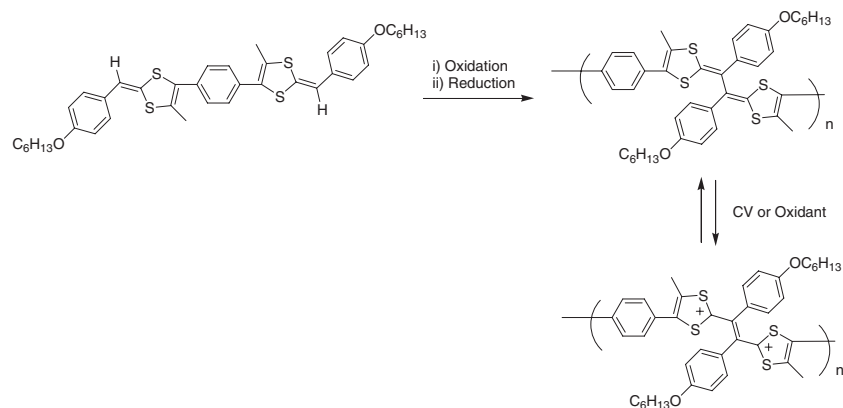
Synthesis of Electron-Donating Polymer Having Vinylogous TTF in the Main Chain

S. INAGI, K. NAKA, D. IIDA, and Y. CHUJO

[Regular Article]

Vol. 38, No. 11, pp 1146–1151 (2006)

An electron-donating polymer containing vinylogous TTF in the main chain was synthesized by oxidative polymerization. The vinylogous TTF unit in the polymer easily formed the dication by electrochemical method and by the addition of the electron acceptor because of the reduced coulombic repulsion in the dication species.



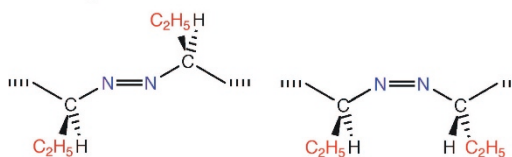
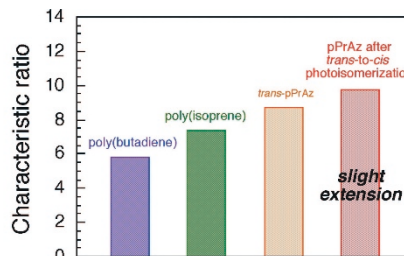
Conformational Analysis of Poly(propionaldehyde azine) in Dilute Solution

A. HASHIDZUME, Y. UENO, and T. SATO

[Regular Article]

Vol. 38, No. 11, pp 1152–1159 (2006)

The conformation of poly(propionaldehyde azine) (PrAz) in tetrahydrofuran was investigated by viscosity measurements before and after *trans*-to-*cis* photoisomerization and also by the rotational isomeric state (RIS) model. This study elucidated that the extended conformation of *trans*-pPrAz (before photoisomerization) arose mainly from the difficulty of gauche conformation around the carbon-carbon bond in the main chain, and that the photoisomerization formed preferentially the anti-*cis* isomer, resulting in a larger characteristic ratio to avoid severe steric hindrance between the ethyl groups.



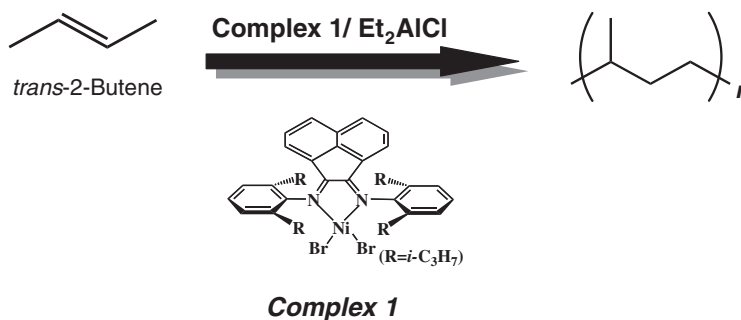
Polymerization of *trans*-2-Butene with (α -Diimine)Ni(II) Complex in Combination with Et₂AlCl

K. ENDO and Y. KONDO

[Regular Article]

Vol. 38, No. 11, pp 1160–1164 (2006)

The polymerization of *trans*-2-butene with (α -diimine)Ni(II) complex **1** in combination with Et₂AlCl gave a high molecular weight polymer with repeating units of –CH₂–CH₂–CH(CH₃)– predominantly. The molecular weight control of the polymer is also achieved with (α -diimine)Ni(II) complex **1**/Et₂AlCl.



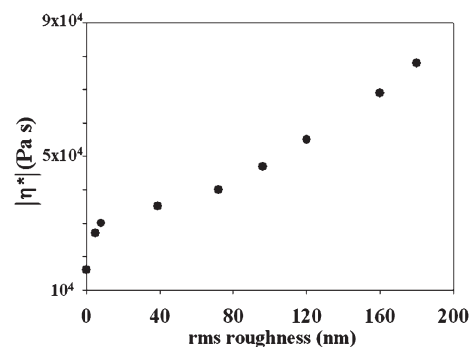
Effect of Interfacial Reaction and Morphology on Rheological Properties of Reactive Bilayer

H. Y. KIM, H. J. KIM, and J. K. KIM

[Regular Article]

Vol. 38, No. 11, pp 1165–1172 (2006)

Plot of $|\eta^*|$ at $\omega = 0.1$ rad/s and 180 °C versus rms roughness for symmetric PS-*m*COOH/PMMA-GMA bilayer with total thickness of 0.6 mm. This result shows that the increase of rms roughness (or interfacial reaction) is strongly related to the increase of $|\eta^*|$. Interestingly, it seems that $|\eta^*|$ is proportional to the rms roughness for larger rms roughness (>40 nm), whereas a linear relationship is not valid for the smaller rms roughness.



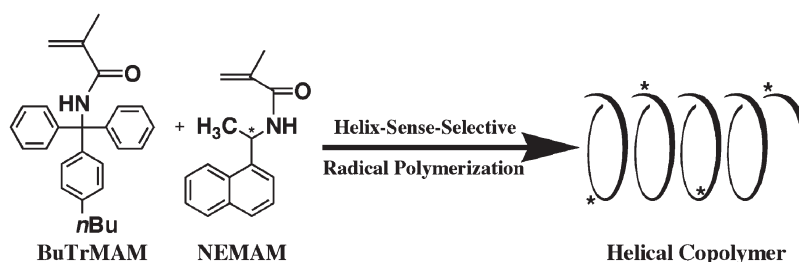
Helicity Induction in *N*-[(4-Butyl)triphenylmethyl]methacrylamide Sequence via Radical Copolymerization with Chiral Monomers

A. K. M. F. AZAM, M. KAMIGAITO, M. TSUJI, and Y. OKAMOTO

[Regular Article]

Vol. 38, No. 11, pp 1173–1181 (2006)

The radical copolymerization of *N*-[(4-butyl)triphenylmethyl]methacrylamide (BuTrMAM) with optically active monomers, such as *N*-[(*R*)-(+)-1-(1-naphthyl)ethyl]methacrylamide, *N*-[(*S*)-(–)-1-(1-naphthyl)ethyl]methacrylamide, *N*-[(*S*)-(–)-1-cyclohexylethyl]methacrylamide, *N*-[(*R*)-(–)-1-cyclohexylethyl]methacrylamide, *N*-[(*S*)-(–)-1-benzylpyrrolidin-3-yl]methacrylamide, and *N*-[(*R*)-(–)-1-benzylpyrrolidin-3-yl]methacrylamide, was carried out. The optical activity of the obtained copolymers significantly depended on the monomer contents. When the chiral monomer content was low in the copolymers, the chiral monomeric units were effective in inducing an excess of the one-handed helix consisting of BuTrMAM monomeric sequences. The helicity induction was most effectively attained using *N*-[1-(1-naphthyl)ethyl]methacrylamide at low temperature.



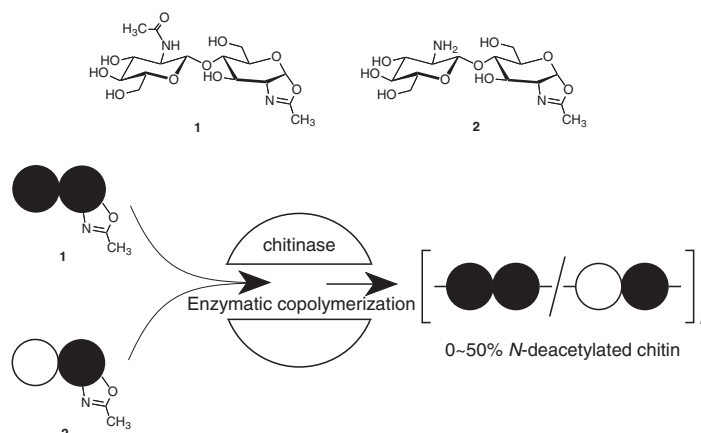
Chitinase-Catalyzed Copolymerization to a Chitin Derivative Having Glucosamine Unit in Controlled Proportion

A. MAKINO, M. OHMAE, and S. KOBAYASHI

[Regular Article]

Vol. 38, No. 11, pp 1182–1188 (2006)

Chitinase-catalyzed copolymerization of an *N,N'*-diacetylchitobiose oxazoline monomer (1) with an *N*-acetylchitobiose oxazoline monomer (2) has been investigated. Chitinase from *Bacillus* sp. catalyzed ring-opening copolyaddition of monomers 1 and 2, giving rise to the corresponding copolymer. The degree of *N*-deacetylation (DDAc) of the product was controlled by varying the comonomer feed ratio.



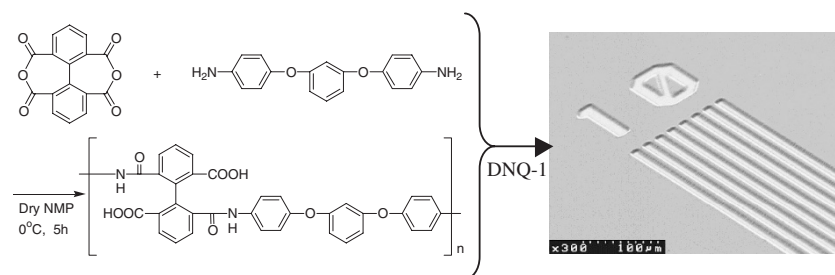
A Positive-Type Alkaline-Developable Photosensitive Polyimide Based on the Poly(amic acid) from 2,2',6,6'-Biphenyl-tetracarboxylic Dianhydride and 1,3-Bis-(4-aminophenoxy)benzene, and a Diazo-naphthoquinone

K. SAKAYORI, Y. SHIBASAKI, and M. UEDA

[Note]

Vol. 38, No. 11, pp 1189–1193 (2006)

A positive-type alkaline-developable photosensitive polyimide (PSPI) based on the poly(amic acid) (PAA-BB) from 2,2',6,6'-biphenyltetracarboxylic dianhydride and 1,3-bis(4-aminophenoxy)benzene, and diazonaphthoquinone (DNQ-1) has been developed. PAA-BB showed an excellent solution stability and a high transmittance at 365 nm. The PSPI containing 80 wt % of PAA-BB and 20 wt % of DNQ-1 exhibited a sensitivity of 110 mJ/cm² and a contrast of 2.0.



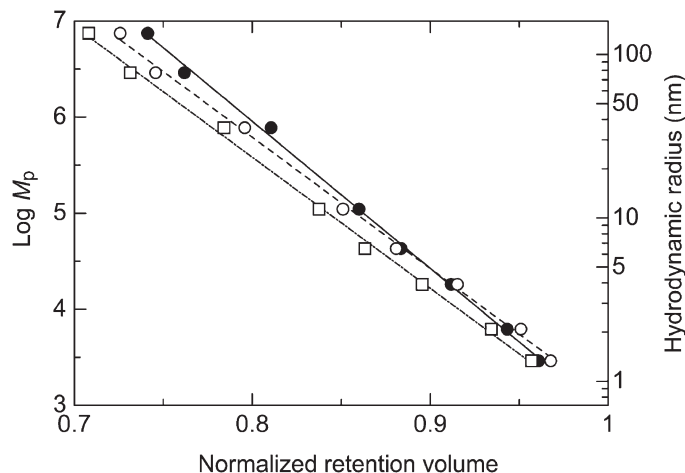
Size Exclusion Chromatography of Standard Polystyrenes with a Wide Range of Molecular Weight Up to 7.45×10^6 on Monolithic Silica Capillary Columns

K. UTE, S. YOSHIDA, T. KITAYAMA, T. BAMBA, K. HARADA, E. FUKUSAKI, A. KOBAYASHI, N. ISHIZUKA, H. MINAKUCHI, and K. NAKANISHI

[Short Communication]

Vol. 38, No. 11, pp 1194–1197 (2006)

A mixture of 8 polystyrene standards with molecular weight (M_p) from 2,900 to 7,450,000 was chromatographed on monolithic silica with 15 or 20 nm mesopores in a fused silica capillary using tetrahydrofuran as eluent. Elution peaks due to each polystyrene standard were separated clearly. Plots of the $\log M_p$ of each polystyrene standard against its retention volume were fitted nicely to a straight line, even in the molecular weight range higher than those expected from the mesopore size of the monolithic silica.



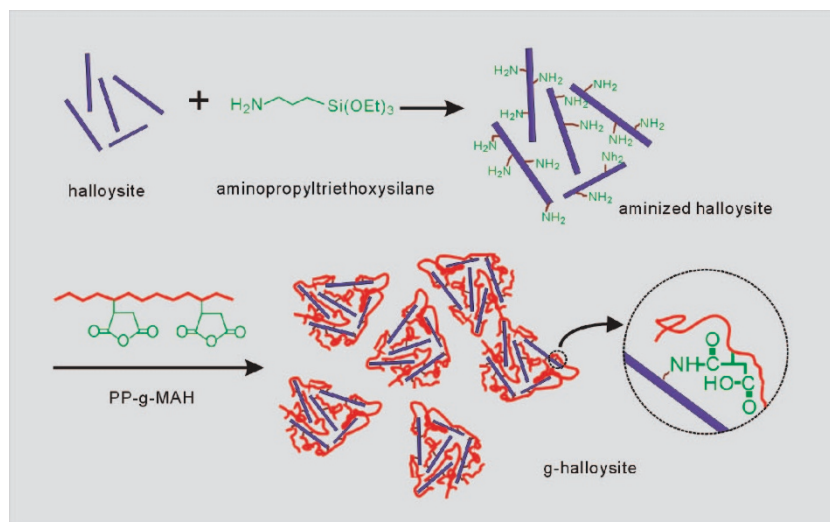
Preparation and Characterization of Polypropylene Grafted Halloysite and Their Compatibility Effect to Polypropylene/Halloysite Composite

M. L. DU, B. C. GUO, M. X. LIU, and D. M. JIA

[Short Communication]

Vol. 38, No. 11, pp 1198–1204 (2006)

Polypropylene (PP) grafted halloysite (g-halloysite) was prepared *via* a two-step coupling process, and g-halloysite was then compounded with PP to form composite. The PP/g-halloysite composite possesses substantially increased mechanical properties although the dispersion of the halloysite in it is less uniform than that in the unmodified one. The increase in mechanical properties is attributed to the better compatibility and stronger interfacial interactions between PP and halloysite. This work provides an effective method for modification of inorganics utilized in polyolefin.



Synthesis and Polymerization of Novel Vinyl Monomers having Intramolecular Urethane Bond and Glycerin Group

E.-C. KANG, A. OGURA, T. IWATA, S. KATAOKA, and Y. MARUHASHI

[Short Communication]

Vol. 38, No. 11, pp 1205–1209 (2006)

IPGMOU monomer synthesized with IPG and MOI, and GLYMOU monomer with two hydroxyl groups synthesized by the deprotection of isopropylidene group in IPGMOU monomer. GLYMOU polymer synthesized by the free radical polymerization of GLYMOU monomer and also synthesized by the deprotection of IPGMOU polymer. The 10 wt % weight-loss degradation temperatures of IPGMOU and GLYMOU polymers were 282 and 240 °C, respectively. The glass transition temperatures of IPGMOU and GLYMOU polymers were 43 and 63 °C, respectively.

