

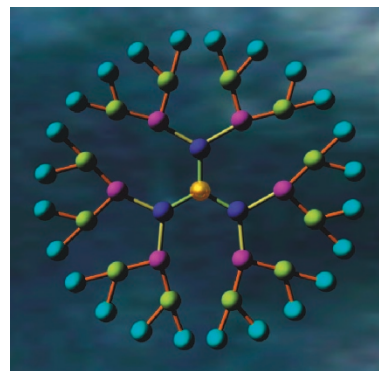
Dendritic Architectures for Design of Photo- and Spin-Functional Nanomaterials

Z. HE, T. ISHIZUKA, and D. JIANG

[Award Accounts: SPSJ Willy Award (2006)]

Vol. 39, No. 9, pp 889–922 (2007)

In this review, we focused on recent works on functional dendrimers, for light-harvesting and photoinduced energy transduction, for photoinduced electron transfer to achieve long-term charge-separation state and photoinduced hydrogen evolution from water, for controlled self-assembly to fabricate photofunctional nanomaterials, and for spin manipulation to control spin state of dendritic radicals and polynuclear metal chains, with an emphasis on correlation between structures and properties of these dendritic macromolecules.



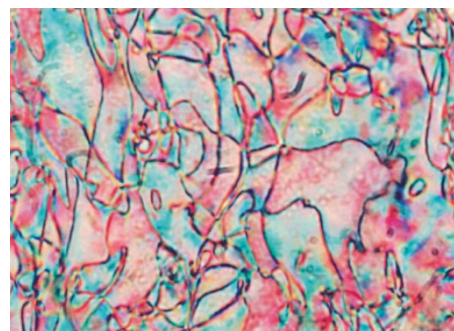
Synthesis and Thermotropic Liquid Crystalline Behavior of Copolymers containing ether ketone and ester links

Y. YANG, X. MA, L. ZHANG, L. WANG, and Z. JIANG

[Regular Article]

Vol. 39, No. 9, pp 923–927 (2007)

Copolymers containing ether ketone and ester links were synthesized and characterized. The glass transition, melting and liquid crystalline transition temperatures of the polymers could be observed to be dependent on the composition of trimer content and surpass a minimum with the increment of trimer content. The further addition of the trimer content resulted in the loss of liquid crystallinity. The polymers showed a continuous change of the scattering peak from strong broad nematic liquid crystalline to sharp crystalline.



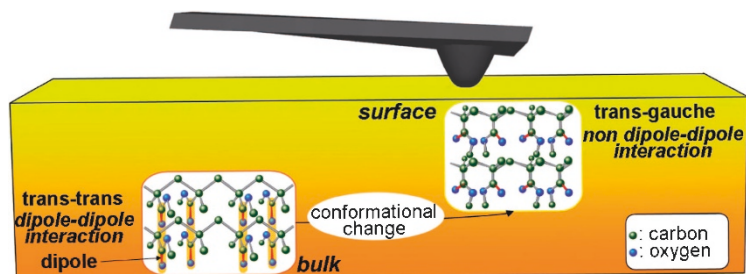
Chain Conformation Effects on Molecular Motions at the Surface of Poly(methyl methacrylate) Films

Y. FUJII, K. AKABORI, K. TANAKA, and T. NAGAMURA

[Regular Article]

Vol. 39, No. 9, pp 928–934 (2007)

Surface relaxation in *st*- and *it*-PMMA films was studied by lateral force microscopy. The extent to which the peak temperature for the surface relaxation processes fell below that of the bulk strongly depended on the stereoregularity of the films. The differences in the chain conformations between the surface and the bulk, which were more remarkable in the *st*-PMMA, produced this variation in surface mobility.



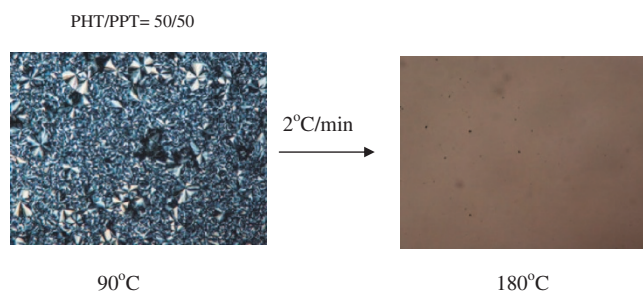
Amorphous-Phase Miscibility and Crystal Phases in Blends of Polymorphic Poly(hexamethylene terephthalate) with Monomorphic Poly(pentamethylene terephthalate)

K. C. YEN, E. M. WOO, and Y.-F. CHEN

[Regular Article]

Vol. 39, No. 9, pp 935–944 (2007)

Annealing or heat scan-induced lamellar thickening and factors influencing crystal unit cells in polymorphic poly(hexamethylene terephthalate) (PHT) were probed. The DSC and WAXD results show that post-scanning or annealing (up to 140 °C) on 110 °C-crystallized PHT neither transform crystal cell types nor does thin lamella into thick lamella. Further, polymorphic poly(hexamethylene terephthalate) (PHT) was blended with monomorphic poly(pentamethylene terephthalate) (PPT) to form a crystalline/crystalline miscible blend system. The miscibility, *via* weak intermolecular interactions, in the amorphous phase of the PHT/PPT blends exerts almost no influence on the crystalline domains, where PPT does not interfere with the formation of α or β crystal forms in PHT, and vice versa, PHT does not interfere with the sole α -crystal form in PPT.



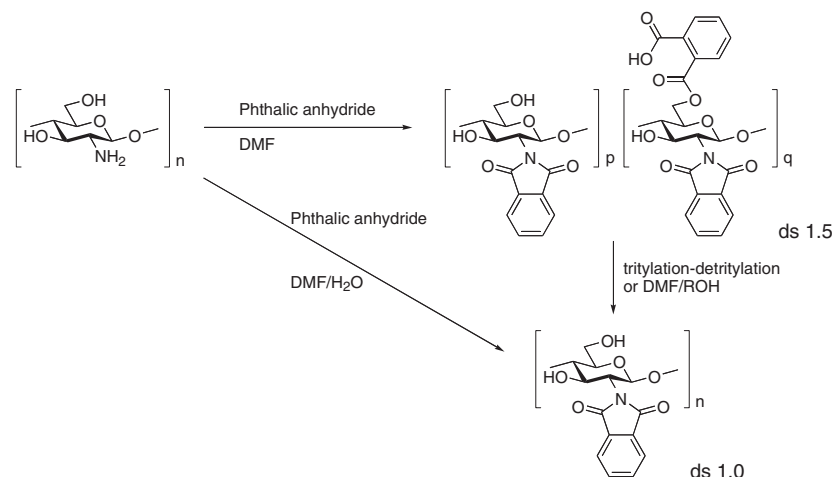
***N*-Phthaloylated Chitosan as an Essential Precursor for Controlled Chemical Modifications of Chitosan: Synthesis and Evaluation**

K. KURITA, H. IKEDA, M. SHIMOJOH, and J. YANG

[Regular Article]

Vol. 39, No. 9, pp 945–952 (2007)

In view of the importance of phthaloylated chitosan as a key intermediate for modification reactions, phthaloylation behavior of chitosan was studied in detail. Under ordinary conditions, *N,O*-phthaloylation occurred, and the *O*-phthaloyl groups had to be removed to give *N*-phthaloyl-chitosan. In the presence of some water, however, perfect discrimination of the functional groups became possible, and selectively and quantitatively *N*-phthaloylated chitosan could be synthesized in a simple one-step reaction. The product exhibited high potential as a precursor for C-6 substitution.



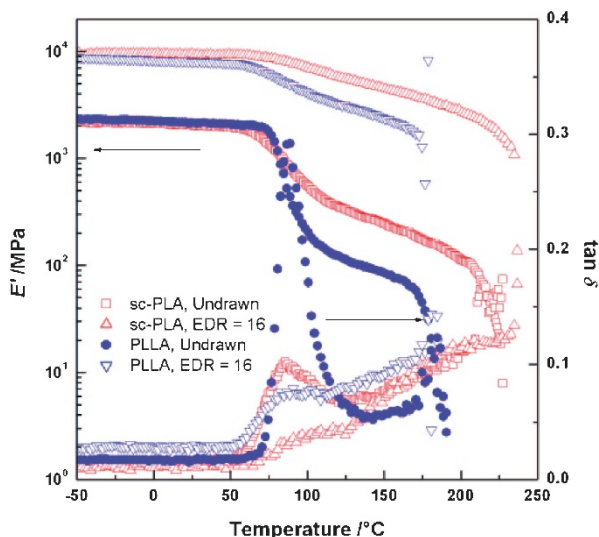
Development of Oriented Morphology and Mechanical Properties upon Drawing of Stereo-Complex of Poly(L-lactic acid) and Poly(D-lactic acid) by Solid-State Coextrusion

D. SAWAI, M. TAMADA, and T. KANAMOTO

[Regular Article]

Vol. 39, No. 9, pp 953–960 (2007)

A film consisting of only sc-crystals prepared from an equimolar blend of PLLA and PDLA was uniaxially drawn. The maximum achieved tensile modulus and strength were 9.5 GPa and 410 MPa, respectively, at RT. Those values were the highest among ever reported for only sc-crystals samples. This film exhibited excellent thermal stability as evaluated by the dynamic mechanical analysis; $E' = 9.5$ GPa at RT, 7 GPa at 100 °C and 3 GPa at 200 °C above the T_m of PLLA.



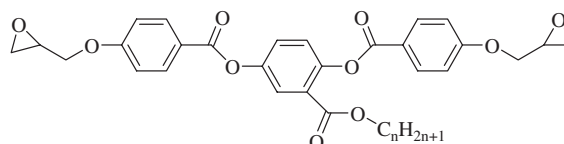
Cure Kinetics and Mechanical Properties of Liquid Crystalline Epoxides with Long Lateral Substituents Cured with Anhydride

L. LIANG, S. REN, Y. ZHENG, Y. LAN, and M. LU

[Regular Article]

Vol. 39, No. 9, pp 961–967 (2007)

A series of LC epoxy monomers with different length of lateral substituents were synthesized and cured with anhydrides. The cure kinetics was investigated by DSC technique. And the phase structures and the mechanical properties of the resulted LC epoxy resins were studied by POM, WAXD, DMA, tensile tests and SEM. Introduction of long substituent into the mesogenic unity can remarkably lower the melting temperature of LC epoxy monomers.



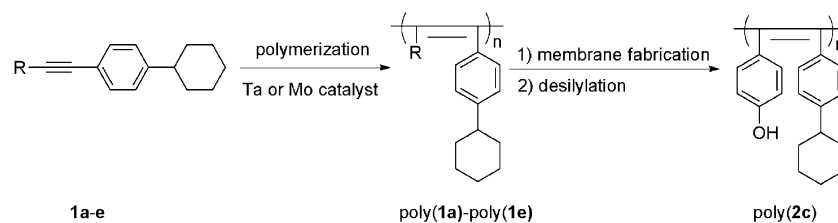
Synthesis and Properties of Substituted Polyacetylenes Having Cyclohexyl Groups

Y. HU, M. SHIOTSUKI, F. SANDA,
and T. MASUDA

[Regular Article]

Vol. 39, No. 9, pp 968–974 (2007)

Disubstituted acetylenes containing cyclohexyl groups were polymerized with Ta- or Mo-based catalyst, and **1a**, **1c**, and **1e** provided high molecular weight polymers. Free-standing membranes of poly(**1a**) and poly(**1c**) were fabricated from toluene solution. Hydroxy-containing membrane poly(**2c**) was prepared by desilylation of siloxy-containing poly(**1c**) using trifluoroacetic acid. According to thermogravimetric analysis (TGA), the produced polymers exhibited high thermal stability, and the onset temperatures of weight loss in air were $\sim 340^\circ\text{C}$. The oxygen permeability coefficients of these membranes were in the range of 17–230 barrers.



R = Ph (**a**); *p*-Me₃SiPh (**b**); *p*-*t*-BuMe₂SiOPh (**c**); Me (**d**); Cl (**e**)

Synthesis and Properties of Thermoplastic Alternating Copolymers Containing Trehalose and Siloxane Units by Hydrosilylation Reaction

N. TERAMOTO, M. UNOSAWA,
S. MATSUSHIMA, and M. SHIBATA

[Regular Article]

Vol. 39, No. 9, pp 975–981 (2007)

Alternating copolymers containing trehalose units and siloxane units were synthesized by the hydrosilylation reaction of a trehalose-based diallyl monomer and telechelic SiH-containing siloxanes in the presence of Karstedt's catalyst. The copolymer shows two glass transitions in DSC measurement. Transparent and flexible films of the copolymers were obtained not only by solution casting but also by thermal melting.

