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Number 22

Macromolecules

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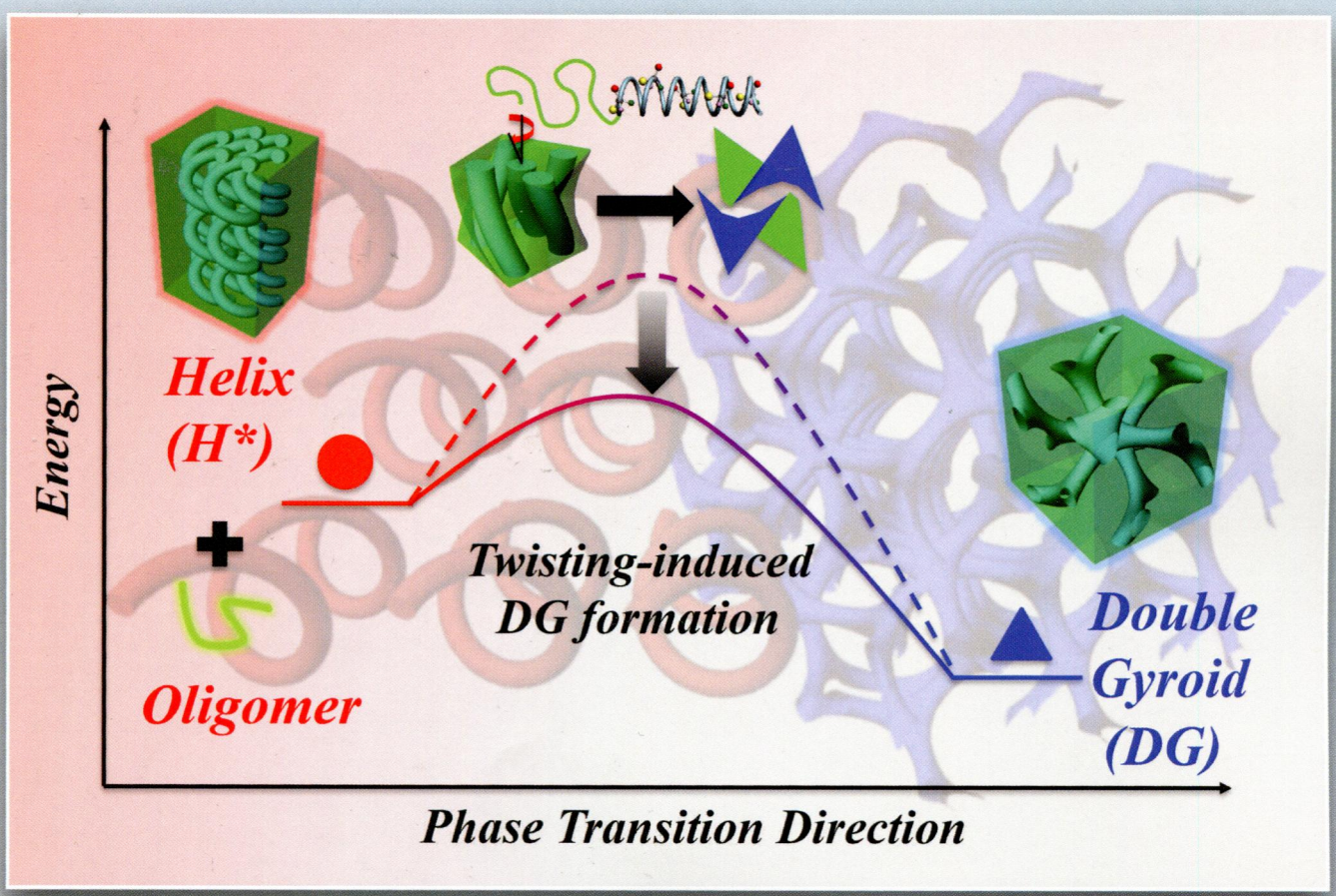

Macromolecules

NOVEMBER 25, 2014
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MAMOBX 47(22) 7679–8130 (2014)
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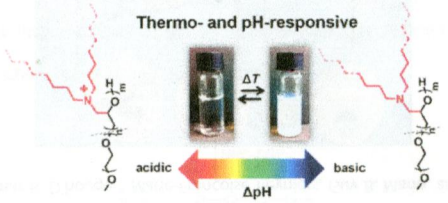
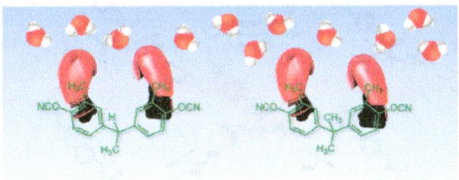
ON THE COVER: We suggest a facile method to acquire double gyroid (DG) phase from the self-assembly of chiral block copolymers (BCPs*), polystyrene-*b*-poly(L-lactide) (PS–PLLA). A wide region for the formation of DG can be found in the phase diagram of the BCPs*, suggesting that helical phase (H*) from the self-assembly of BCPs* can serve as a stepping stone for the formation of the DG due to an easy path for order–order transition from two-dimensional to three-dimensional (network) structure. Moreover, the order–order transition from metastable H* to stable DG can be expedited by blending the PS–PLLA with compatible entity. Unlike the conventional way for blending BCP with homopolymer, PS–PLLA blends are prepared by using styrene oligomer (S) to fine-tune the morphologies of the blends at which the molecular weight ratio of the S and compatible PS block (r) is less than 0.1. Owing to the use of the low-molecular-weight oligomer, the increase of BCP chain mobility in the blends significantly reduces the transformation time for the order–order transition from H* to DG. Consequently, by taking advantage of degradable character of the PLLA, nanoporous gyroid SiO_2 can be fabricated using hydrolyzed PS–PLLA blends as a template for sol–gel reaction followed by removal of the PS matrix. See page 7993.

Articles

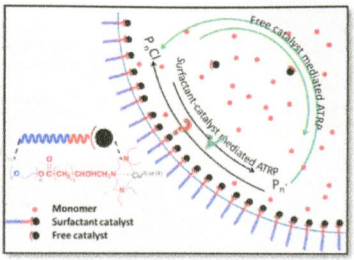




7701 S DOI: 10.1021/ma501905d

Surfactant–Ligand Design for *ab Initio* Emulsion Atom Transfer Radical Polymerization

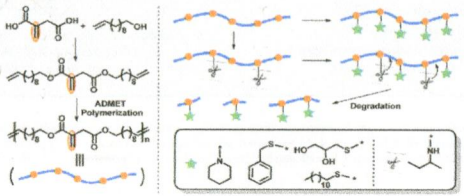
Yipeng Wei, Yanyu Jia, Wen-Jun Wang,* Bo-Geng Li, and Shiping Zhu*



7707 S DOI: 10.1021/ma5020066

Synthesis, Functionalization, and Controlled Degradation of High Molecular Weight Polyester from Itaconic Acid via ADMET Polymerization

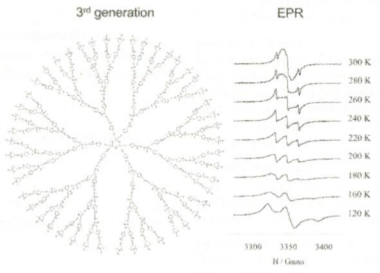
An Lv, Zi-Long Li, Fu-Sheng Du,* and Zi-Chen Li*



7717 S DOI: 10.1021/ma502062q

Radical Dendrimers: A Family of Five Generations of Phosphorus Dendrimers Functionalized with TEMPO Radicals

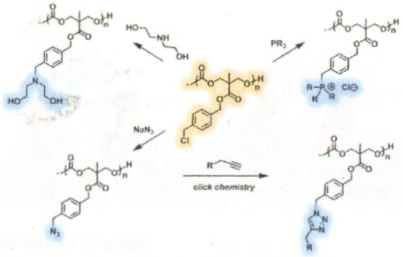
Elena Badetti, Vega Lloveras, Jose Luis Muñoz-Gómez, Rosa María Sebastián, Anne Marie Caminade, Jean Pierre Majoral, Jaume Veciana, and José Vidal-Gancedo*



7725 S DOI: 10.1021/ma501734y

Benzyl Chloride-Functionalized Polycarbonates: A Versatile Platform for the Synthesis of Functional Biodegradable Polycarbonates

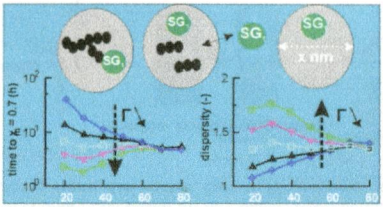
Robert J. Ono, Shao Qiong Liu, Shrinivas Venkataraman, Willy Chin, Yi Yan Yang, and James L. Hedrick*



7732 S DOI: 10.1021/ma501746r

4-Dimensional Modeling Strategy for an Improved Understanding of Miniemulsion NMP of Acrylates Initiated by SG1-Macroinitiator

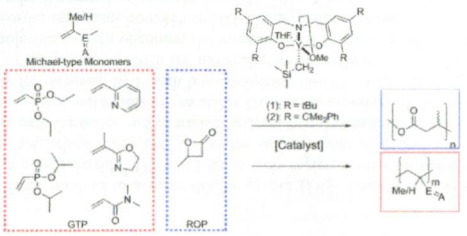
Paul H. M. Van Steenberge, Dagmar R. D'hooge,* Marie-Françoise Reyniers, Guy B. Marin, and Michael F. Cunningham*



7742 S DOI: 10.1021/ma501754u

Versatile 2-Methoxyethylaminobis(phenolate)yttrium Catalysts: Catalytic Precision Polymerization of Polar Monomers via Rare Earth Metal-Mediated Group Transfer Polymerization

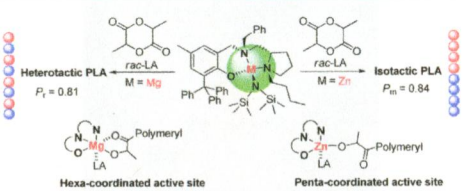
Peter T. Altenbuchner, Benedikt S. Soller, Stefan Kissling, Thomas Bachmann, Alexander Kronast, Sergei I. Vagin, and Bernhard Rieger*



7750 S DOI: 10.1021/ma501896r

Stereoselectivity Switch between Zinc and Magnesium Initiators in the Polymerization of *rac*-Lactide: Different Coordination Chemistry, Different Stereocontrol Mechanisms

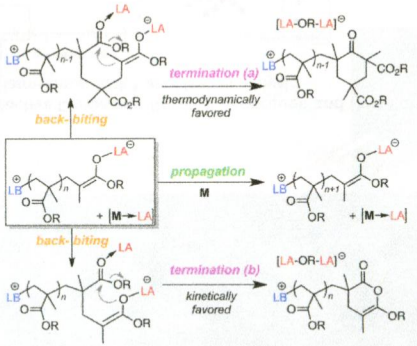
Haobing Wang, Yang Yang, and Haiyan Ma*



7765 S DOI: 10.1021/ma5019389

Chain Propagation and Termination Mechanisms for Polymerization of Conjugated Polar Alkenes by [Al]-Based Frustrated Lewis Pairs

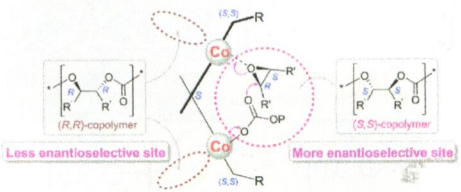
Jianghua He, Yuetao Zhang, Laura Falivene, Lucia Caporaso, Luigi Cavallo,* and Eugene Y.-X. Chen*



7775 S DOI: 10.1021/ma5019186

Mechanistic Understanding of Dinuclear Cobalt(III) Complex Mediated Highly Enantioselective Copolymerization of *meso*-Epoxides with CO_2

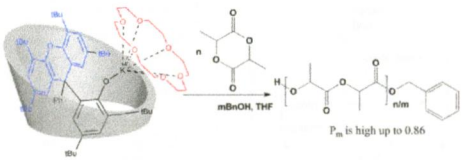
Ye Liu, Wei-Min Ren, Chuang Liu, Song Fu, Meng Wang, Ke-Ke He, Rong-Rong Li, Rong Zhang, and Xiao-Bing Lu*



7789 S DOI: 10.1021/ma502000y

Highly Iso-Selective and Active Catalysts of Sodium and Potassium Monophenoxides Capped by a Crown Ether for the Ring-Opening Polymerization of *rac*-Lactide

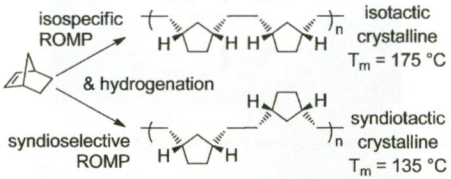
Jinjin Zhang, Jiao Xiong, Yangyang Sun, Ning Tang, and Jincai Wu*



7797 S DOI: 10.1021/ma502020u

Iso- and Syndio-Selective ROMP of Norbornene and Tetracyclododecene: Effects of Tacticity Control on the Hydrogenated Ring-Opened Poly(cycloolefin)s

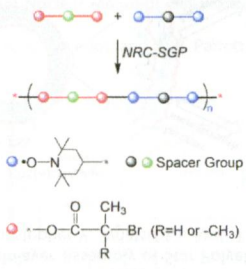
Shigetaka Hayano* and Yuki Nakama



7812 S DOI: 10.1021/ma501613x

Synthesis of Thermal Degradable Poly(alkoxyamine) through a Novel Nitroxide Radical Coupling Step Growth Polymerization Mechanism

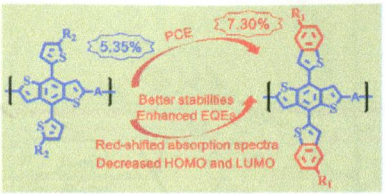
Xuepu Wang, Jian Huang, Lingdi Chen, Yujie Liu, and Guowei Wang*



7823 (S) DOI: 10.1021/ma501756p

Extending π-Conjugation System with Benzene: An Effective Method To Improve the Properties of Benzodithiophene-Based Polymer for Highly Efficient Organic Solar Cells

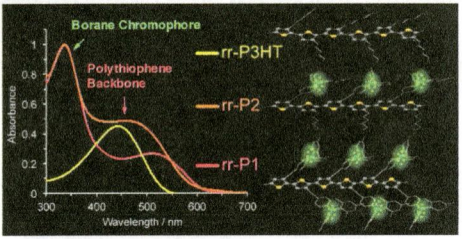
Jiuxing Wang, Manjun Xiao, Weichao Chen, Meng Qiu, Zhengkun Du, Weiguo Zhu, Shuguang Wen, Ning Wang, and Renqiang Yang*



7831 (S) DOI: 10.1021/ma501969q

Regioregular Organoborane-Functionalized Poly(3-alkynylthiophene)s

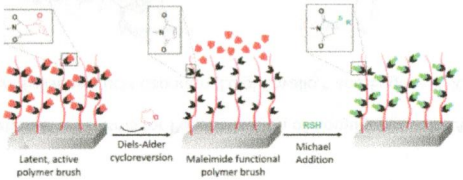
F. Guo, X. Yin, F. Pammer, F. Cheng, D. Fernandez, R. A. Lalancette, and F. Jäkle*



7842 (S) DOI: 10.1021/ma5015098

Maleimide-Functionalized Thiol Reactive Copolymer Brushes: Fabrication and Post-Polymerization Modification

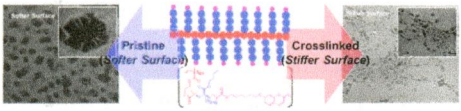
Tugce Nihal Gevrek, Tugba Bilgic, Harm-Anton Klok,* and Amitav Sanyal*



7852 S DOI: 10.1021/ma501609c

Phototunable Supersoft Elastomers using Coumarin Functionalized Molecular Bottlebrushes for Cell-Surface Interactions Study

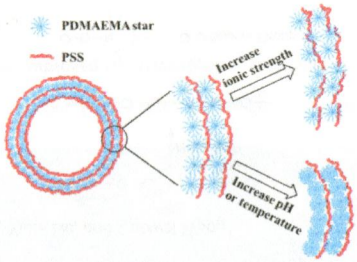
Kosuke Mukumoto, Saadyah E. Averick, Sangwoo Park, Alper Nese, Anastasia Mpoukouvalas, Yukai Zeng, Kaloian Koynov, Philip R. Leduc, and Krzysztof Matyjaszewski*



7858 S DOI: 10.1021/ma501853c

Multiresponsive Microcapsules Based on Multilayer Assembly of Star Polyelectrolytes

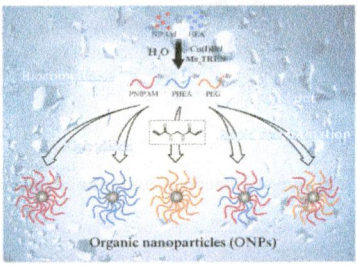
Weinan Xu, Petr A. Ledin, Felix A. Plamper, Christopher V. Synatschke, Axel H. E. Müller, and Vladimir V. Tsukruk*



7869 S DOI: 10.1021/ma502008j

Highly Efficient and Versatile Formation of Biocompatible Star Polymers in Pure Water and Their Stimuli-Responsive Self-Assembly

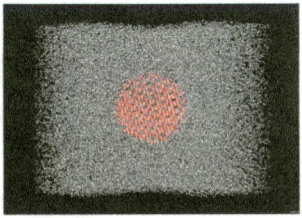
Thomas G. McKenzie, Edgar H. H. Wong, Qiang Fu, Shu Jie Lam, Dave E. Dunstan, and Greg G. Qiao*



7878 S DOI: 10.1021/ma500556q

How Thick Is the Polymer Interphase in Nanocomposites? Probing It by Local Stress Anisotropy and Gas Solubility

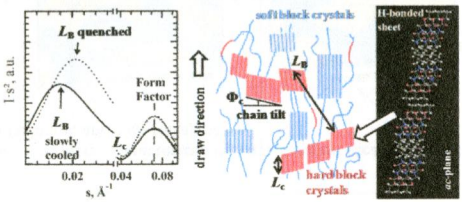
Evangelos Voyiatzis,* Mohammad Rahimi, Florian Müller-Plathe, and Michael C. Böhm



7890 S DOI: 10.1021/ma501545b

Primary Chemical Sequence Ultimately Determines Crystal Thickness in Segmented All-Aliphatic Copolymers

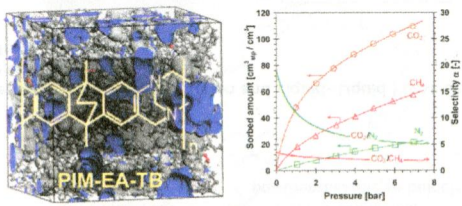
Yaroslav I. Odarchenko,* Denis V. Anokhin, David Doblas, Martin Rosenthal, Jaime J. Hernandez, Loic Vidal, Niels J. Sijbrandi, Ad J. Kimenai, Edwin P. C. Mes, René Broos, Georg Bar, Pieter J. Dijkstra, Jan Feijen, Mikhail Soloviev, and Dimitri A. Ivanov*



7900 S DOI: 10.1021/ma501469m

Molecular Modeling and Gas Permeation Properties of a Polymer of Intrinsic Microporosity Composed of Ethanoanthracene and Tröger's Base Units

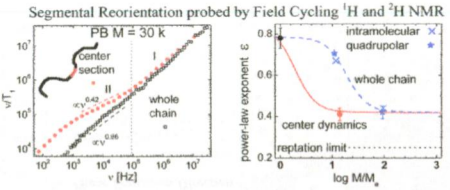
Elena Tocci,* Luana De Lorenzo, Paola Bernardo, Gabriele Clarizia, Fabio Bazzarelli, Neil B. Mckeown, Mariolino Carta, Richard Malpass-Evans, Karel Friess, Kryštof Pilnáček, Marek Lanč, Yuri. P. Yampolskii, Ludmila Strarannikova, Viktor Shantarovich, Michele Mauri, and Johannes C. Jansen*



7917 DOI: 10.1021/ma501520u

Field-Cycling NMR Relaxometry Probing the Microscopic Dynamics in Polymer Melts

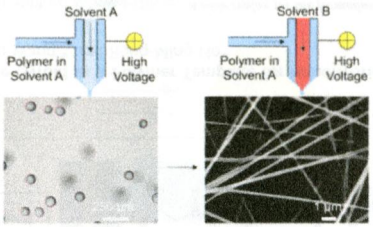
M. Hofmann, B. Kresse, A. F. Privalov, L. Willner, N. Fatkullin, F. Fujara, and E. A. Rössler*



7930 S DOI: 10.1021/ma5016616

Core-Liquid-Induced Transition from Coaxial Electrospray to Electrospinning of Low-Viscosity Poly(lactide-*co*-glycolide) Sheath Solution

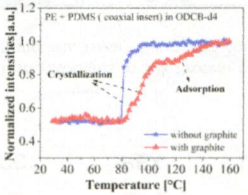
C. J. Luo* and M. Edirisinghe



7939 DOI: 10.1021/ma5017902

Studying the Interactions of Polyethylene with Graphite in the Presence of Solvent by High Temperature Thermal Gradient Interactive Chromatography, Thermal Gradient Nuclear Magnetic Resonance Spectroscopy, and Solution Differential Scanning Calorimetry

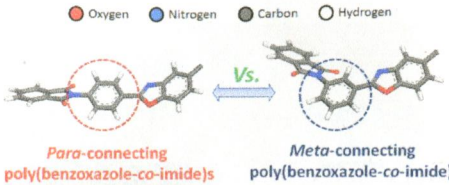
D. Mekap, F. Malz, R. Brüll,* Z. Zhou, R. Cong, A. W. deGroot, and A. R. Parrott



7947 DOI: 10.1021/ma501891m

Effect of Isomerism on Molecular Packing and Gas Transport Properties of Poly(benzoxazole-*co*-imide)s

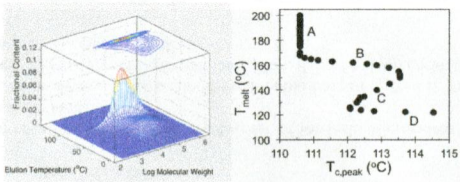
Yongbing Zhuang, Jong Geun Seong, Yu Seong Do, Hye Jin Jo, Moon Joo Lee, Gang Wang, Michael D. Guiver,* and Young Moo Lee*



7958 DOI: 10.1021/ma501937c

Interplay between a Strong Memory Effect of Crystallization and Liquid–Liquid Phase Separation in Melts of Broadly Distributed Ethylene–1-Alkene Copolymers

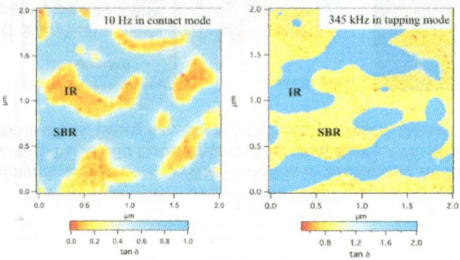
Al Mamun, Xuejian Chen, and Rufina G. Alamo*



7971 DOI: 10.1021/ma501562q

Viscoelasticity of Inhomogeneous Polymers Characterized by Loss Tangent Measurements Using Atomic Force Microscopy

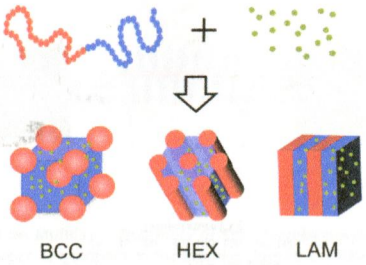
Hung K. Nguyen, Makiko Ito, So Fujinami, and Ken Nakajima*



7978 S DOI: 10.1021/ma5016819

Small-Angle X-ray Scattering of Concentration Dependent Structures in Block Copolymer Solutions

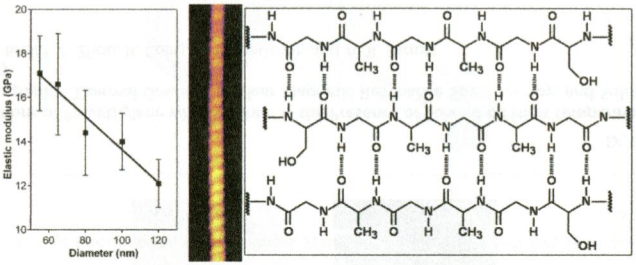
Soo-Hyung Choi, Frank S. Bates,* and Timothy P. Lodge*



7987 DOI: 10.1021/ma501864g

Control of β-Sheet Crystal Orientation and Elastic Modulus in Silk Protein by Nanoconfinement

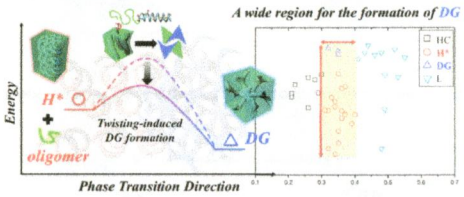
Yanfang Shi, Xiaohui Li, Guangzhu Ding, Yangjiang Wu, Yuyan Weng, and Zhijun Hu*



7993 S DOI: 10.1021/ma501957b

A Facile Method To Fabricate Double Gyroid as a Polymer Template for Nanohybrids

Hsiao-Fang Wang, Lv-Hong Yu, Xin-Bo Wang,* and Rong-Ming Ho*

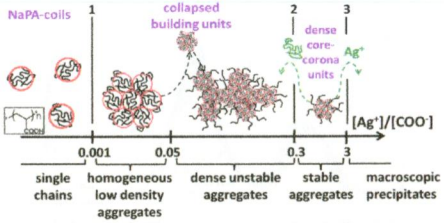


8002 S

DOI: 10.1021/ma501146m

Specific Interactions of Ag^+ Ions with Anionic Polyacrylate Chains in Dilute Solution

A. Ezhova and K. Huber*



8012 S

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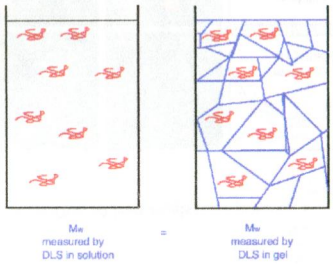
Measurement of Dynamic Light Scattering Intensity in Gels

Cyrille Rochas and Erik Geissler*

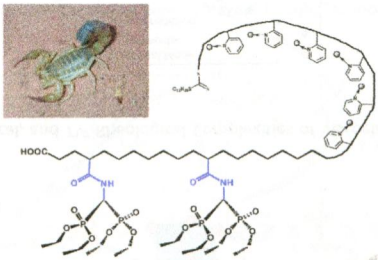


8018

DOI: 10.1021/ma501997x

Synthesis, Characterization, and Antibacterial Properties of a Hydroxyapatite Adhesive Block Copolymer

Qiang Matthew Zhang and Michael J. Serpe*

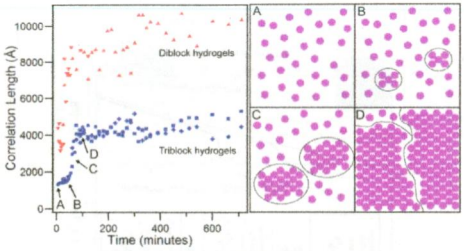


8026 S

DOI: 10.1021/ma5017852

Structural Evolution of Polyelectrolyte Complex Core Micelles and Ordered-Phase Bulk Materials

Daniel V. Krogstad, Nathaniel A. Lynd, Daigo Miyajima, Jeffrey Gopez, Craig J. Hawker, Edward J. Kramer, and Matthew V. Tirrell*

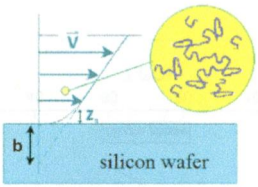


8033

DOI: 10.1021/ma501320d

Wall Slip of Tridisperse Polymer Melts and the Effect of Unentangled versus Weakly Entangled Chains

S. Mostafa Sabzevari, Itai Cohen, and Paula M. Wood-Adams*

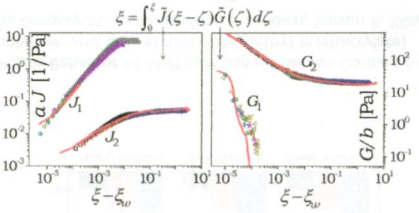


8041 S

DOI: 10.1021/ma501352c

Validation of *Effective* Time Translational Invariance and Linear Viscoelasticity of Polymer Undergoing Cross-linking Reaction

Manish Kaushal and Yogesh M. Joshi*

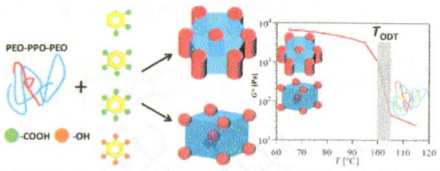


8048 S

DOI: 10.1021/ma501816d

Rheological Study of Order-to-Disorder Transitions and Phase Behavior of Block Copolymer–Surfactant Complexes Containing Hydrogen-Bonded Small Molecule Additives

Rohit Kothari, H. Henning Winter, and James J. Watkins*

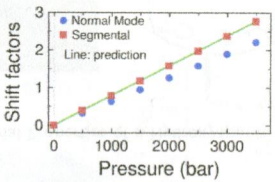


8056

DOI: 10.1021/ma501843u

Thermo-Rheological, Piezo-Rheological, and *TV*$^{\gamma}$-Rheological Complexities of Viscoelastic Mechanisms in Polymers

K. L. Ngai* and D. J. Plazek

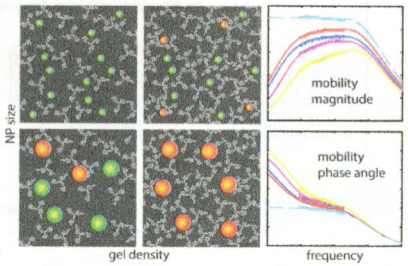


8064 S

DOI: 10.1021/ma502021s

Electroacoustic Spectroscopy of Nanoparticle-Doped Hydrogels

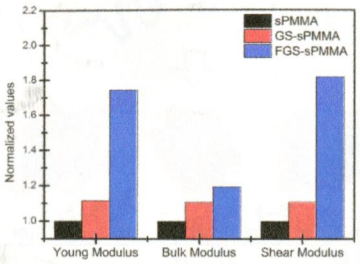
Vahid Adibnia and Reghan J. Hill*



8072 S DOI: 10.1021/ma5017693

Determination of the Mechanical Properties of a Poly(methyl methacrylate) Nanocomposite with Functionalized Graphene Sheets through Detailed Atomistic Simulations

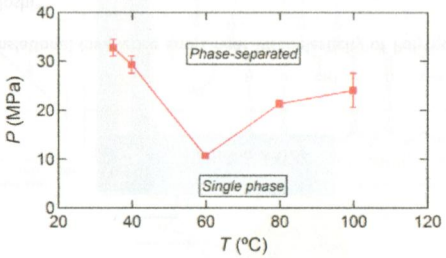
Emmanuel N. Skountzos, Alexandros Anastassiou, Vlasis G. Mavrantzas,* and Doros N. Theodorou



8089 S DOI: 10.1021/ma5018154

Thermodynamic Interactions and Phase Behavior of Multicomponent Blends Containing Supercritical Carbon Dioxide, Styrene–Acrylonitrile Random Copolymer, and Deuterated Poly(methyl methacrylate)

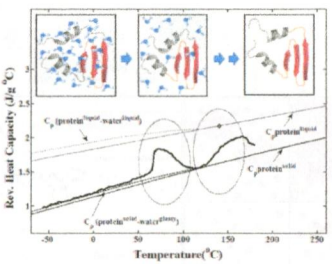
Nicholas P. Young, Sebnem Inceoglu, Gregory M. Stone, Andrew J. Jackson, Steven R. Kline, Stéphane Costeux, and Nitash P. Balsara*



8098 S DOI: 10.1021/ma5016215

Influence of Water on Protein Transitions: Thermal Analysis

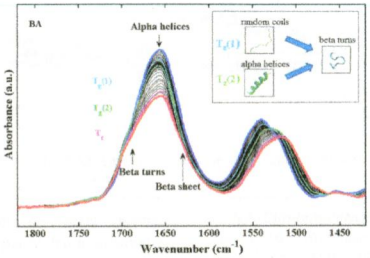
Wenwen Huang, Sreevidhya Krishnaji, Olena Rabotyagova Tokareva, David Kaplan, and Peggy Cebe*



8107 S DOI: 10.1021/ma5016227

Influence of Water on Protein Transitions: Morphology and Secondary Structure

Wenwen Huang, Sreevidhya Krishnaji, Olena Rabotyagova Tokareva, David Kaplan, and Peggy Cebe*

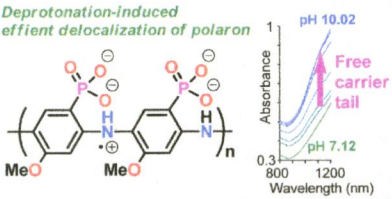


Notes

8115 DOI: 10.1021/ma5016209

Deprotonation-Induced Efficient Delocalization of Polaron in Self-Doped Poly(anilinephosphonic acid)

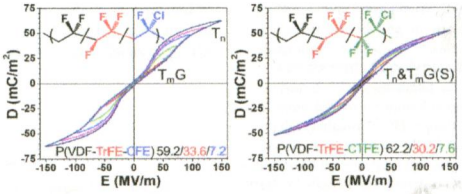
Toru Amaya,* Yasushi Abe, and Toshikazu Hirao*



8119 S DOI: 10.1021/ma501852x

Relaxor Ferroelectric Behavior from Strong Physical Pinning in a Poly(vinylidene fluoride-*co*-trifluoroethylene-*co*-chlorotrifluoroethylene) Random Terpolymer

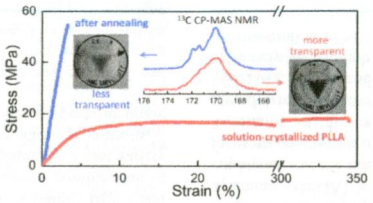
Lianyun Yang, Brady A. Tyburski, Fabrice Domingues Dos Santos, Maya K. Endoh, Tadanori Koga, Daniel Huang, Yijun Wang, and Lei Zhu*



DOI: 10.1021/ma501956f

Heating and Annealing Induced Structural Reorganization and Embrittlement of Solution-Crystallized Poly(L-lactic acid)

Pengju Pan,* Lili Han, Guorong Shan, and Yongzhong Bao



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