The last twenty years have seen a substantial effort to understand relaxation, mechanics, diffusion, and the glass transition in thin polymer films and related geometries. This special topical brings together an exciting collection of papers utilizing experiment, simulation, and theory, by established and emerging experts in the field. We anticipate that it can play an important role in introducing new researchers to the field and also defining important directions for future work. We are grateful to the authors who contributed manuscripts to this special issue, and see this collection as an important resource for those both inside and outside of the field. The Guest Editors provide some background and perspective in the Preface to the special topic.

With Guest Editors Mark Ediger and Kenneth Schweizer

**PREFACE**

Special Topic on Dynamics of Polymer Materials in Thin Films and Related Geometries

M. D. Ediger and Kenneth S. Schweizer


DOI: [10.1063/1.4983279](http://dx.doi.org/10.1063/1.4983279)

**FOCUS**

Structure and dynamics of the interfacial layer in polymer nanocomposites with attractive interactions

Shiwang Cheng, Bobby Carroll, Vera Bocharova, Jan-Michael Carrillo, Bobby G. Sumpter


DOI: [10.1063/1.4978504](http://dx.doi.org/10.1063/1.4978504)

Influence of chemistry, interfacial width, and non-isothermal conditions on spatially heterogeneous activated relaxation and elasticity in glass-forming free standing films

Stephen Mirigian and Kenneth S. Schweizer


DOI: [10.1063/1.4974766](http://dx.doi.org/10.1063/1.4974766)

Glassy dynamics of polymethylphenylsiloxane in one- and two-dimensional nanometric confinement—A comparison

Wycliffe K. Kipnusu, Mohamed Elsayed, Reinhard Krause-Rehberg, and Friedrich Kremer


DOI: [10.1063/1.4974767](http://dx.doi.org/10.1063/1.4974767)

Reduced-mobility layers with high internal mobility in poly(ethylene oxide)–silica nanocomposites

Yury Golitsyn, Gerald J. Schneider, and Kay Saalwächter


DOI: [10.1063/1.4974768](http://dx.doi.org/10.1063/1.4974768)

Unexpected impact of irreversible adsorption on thermal expansion: Adsorbed layers are not that dead

Marie-Luise Braatz, Leslie Infantas Meléndez, Michele Sferrazza, and Simone Napolitano


DOI: [10.1063/1.4974769](http://dx.doi.org/10.1063/1.4974769)

Interfacial interaction and glassy dynamics in stacked thin films of poly(methyl methacrylate)

Tatsuhiko Hayashi, Kenta Segawa, Koichiro Sadakane, Koji Fukao, and Norifumi L. Yamada


DOI: [10.1063/1.4974785](http://dx.doi.org/10.1063/1.4974785)

Polymer dynamics under cylindrical confinement featuring a locally repulsive surface: A quasielastic neutron scattering study

M. Krutyeva, S. Pasini, M. Monkenbusch, J. Allgaier, J. Maiz


DOI: [10.1063/1.4974786](http://dx.doi.org/10.1063/1.4974786)

Local glass transition temperature \(T_g(z)\) of polystyrene next to different polymers: Hard vs. soft confinement

Roman R. Baglay and Connie B. Roth


DOI: [10.1063/1.4975168](http://dx.doi.org/10.1063/1.4975168)

Relaxation processes and glass transition of confined polymer melts: A molecular dynamics simulation of 1,4-polybutadiene between graphite walls

M. Solar, K. Binder, and W. Paul


DOI: [10.1063/1.4975390](http://dx.doi.org/10.1063/1.4975390)

Description of poly(ethylene-propylene) confined in nanopores by a modified Rouse model

Matthias Muthmann, Margarita Krutyeva, Lutz Willner, Jurgen Allgaier, Dieter Richter


DOI: [10.1063/1.4975977](http://dx.doi.org/10.1063/1.4975977)

Dynamical heterogeneity in a vapor-deposited polymer glass

Wengang Zhang, Jack F. Douglas, and Francis W. Starr


DOI: [10.1063/1.4976542](http://dx.doi.org/10.1063/1.4976542)

Side-group size effects on interfaces and glass formation in supported polymer thin films

Wenjie Xia, Jake Song, David D. Hsu, and Sinan Keten


DOI: [10.1063/1.4976702](http://dx.doi.org/10.1063/1.4976702)
Complex nonequilibrium dynamics of stacked polystyrene films deep in the glassy state
Virginie M. Boucher, Daniele Cangialosi, Angel Alegría, and Juan Colmenero

Depth-resolved local conformation and thermal relaxation of polystyrene near substrate interface
Hung Kim Nguyen, Manabu Inutsuka, Daisuke Kawaguchi, and Keiji Tanaka

Interfacial and topological effects on the glass transition in free-standing polystyrene films
Alexey V. Lyulin, Nikolay K. Balabaev, Arlette R. C. Baljon, Gerardo Mendoza, Curtis W. Frank

The relationship between dynamic and pseudo-thermodynamic measures of the glass transition temperature in nanostructured materials
Jayachandra Hari Mangalara, Mark E. Mackura, Michael D. Marvin, and David S. Simmons

Limited surface mobility inhibits stable glass formation for 2-ethyl-1-hexanol
M. Tylinski, M. S. Beasley, Y. Z. Chua, C. Schick, and M. D. Ediger

Network confinement and heterogeneity slows nanoparticle diffusion in polymer gels
Emmabeth Parrish, Matthew A. Caporizzo, and Russell J. Composto

How thermal stress alters the confinement of polymers vitrificated in nanopores
Chao Teng, Linling Li, Yong Wang, Rong Wang, Wei Chen

Complex dynamics of capillary imbibition of poly(ethylene oxide) melts in nanoporous alumina
Yang Yao, Stelios Alexandris, Franziska Henrich, Gunter Auernhammer, Martin Steinhart

Unexpected behavior of ultra-thin films of blends of polystyrene/poly(vinyl methyl ether) studied by specific heat spectroscopy
Sherif Madkour, Paulina Szymoniak, Christoph Schick, and Andreas Schönholz

The glass transition temperature of thin films: A molecular dynamics study for a bead-spring model
Craig S. Stevenson, John G. Curro, and John D. McCoy

Molecular weight dependence of the intrinsic size effect on Tg in AAO template-supported polymer nanorods: A DSC study
Shadid Askar, Tong Wei, Anthony W. Tan, and John M. Torkelson

Surface transport mechanisms in molecular glasses probed by the exposure of nano-particles
Shigang Ruan, Daniele Musumeci, Wei Zhang, Ankur Goyal, M. D. Ediger

Direction-dependent elastic properties and phononic behavior of PMMA/BaTiO3 nanocomposite thin films

Influence of bidisperse self-assembled monolayer structure on the slip boundary condition of thin polymer films
Joshua D. McGraw, Mischa Klos, Antoine Bridet, Hendrik Hähl, Michael Paulus

Molecular dynamics simulation of the capillary leveling of viscoelastic polymer films

Using deposition rate to increase the thermal and kinetic stability of vapor-deposited hole transport layer glasses via a simple sublimation apparatus
Kenneth L. Earns, Paige Krzykowski, and Zachary Devereaux

The glass transition and enthalpy recovery of a single polystyrene ultrathin film using Flash DSC
Yung P. Koh and Sandee L. Simon

Exploring the broadening and the existence of two glass transitions due to competing interfacial effects in thin, supported polymer films
Ethan C. Glor, Gabriela V. Angrand, and Zahra Fakhraai

Polymer and spherical nanoparticle diffusion in nanocomposites
Argyrios Karakostas, Russell J. Composto, Karen I. Winey, and Nigel Clarke

Grafted polymer chains suppress nanoparticle diffusion in athermal polymer melts
Chia-Chun Lin, Philip J. Griffin, Huikuan Chao, Michael J. A. Hore, Kohji Ohno

Dynamics of ultra-thin polystyrene with and without a (artificial) dead layer studied by resonance enhanced dynamic light scattering