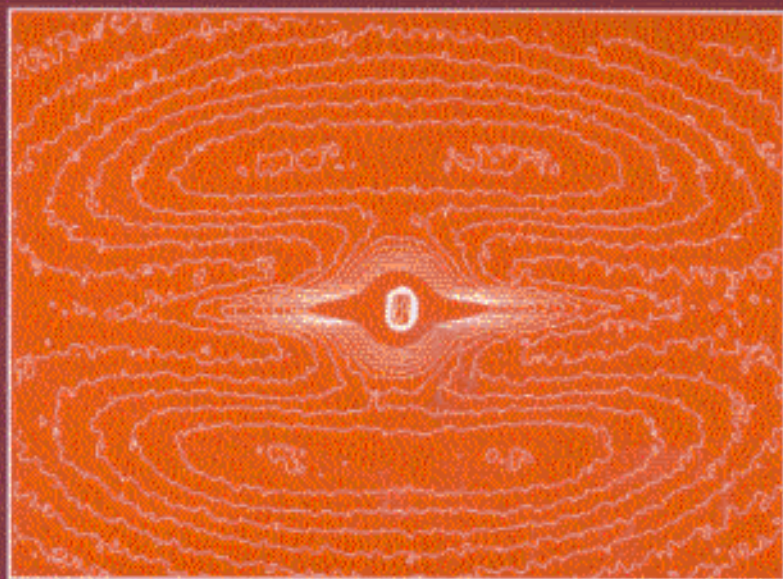


ACS SYMPOSIUM SERIES 739

Scattering from Polymers

Characterization by X-rays, Neutrons, and Light



EDITED BY

Peggy Cebe, Benjamin S. Hsiao,
and David J. Lohse

Contents

Preface	xi
---------------	----

INTRODUCTION

1. Introduction to Scattering from Polymers	2
Peggy Cebe	

SCATTERING METHODS

2. Characteristics of Small-Angle Diffraction Data from Semicrystalline Polymers and Their Analysis in Elliptical Coordinates.....	24
N. S. Murthy, D. T. Grubb, and K. Zero	
3. Analysis of SAXS Fiber Patterns by Means of Projections	41
N. Stribeck	
4. Studying Polymer Interfaces Using Neutron Reflection	57
D. G. Bucknall, S. A. Butler, and J. S. Higgins	
5. Neutron Diffraction by Crystalline Polymers.....	74
Yasuhiro Takahashi	
6. Simulation of Melting Transitions in Crystalline Polymers	93
Lucio Toma and Juan A. Subirana	
7. Neutron Spin Echo Spectroscopy at the NIST Center for Neutron Research.....	103
N. Rosov, S. Rathgeber, and M. Monkenbusch	

POLYMER CRYSTALLIZATION AND MORPHOLOGY

8. Isothermal Thickening and Thinning Processes in Low Molecular Weight Poly(ethylene oxide) Fractions Crystallized from the Melt: Effects of Molecular Configurational Defects on Crystallization, Melting, and Annealing.....	118
Er-Qiang Chen, Song-Wook Lee, Anqiu Zhang, Bon-Suk Moon, Ian Mann, Frank W. Harris, Stephen Z. D. Cheng, Benjamin S. Hsiao, Fengji Yeh, and Ernst D. von Meerwall	

- 9. Investigating the Mechanisms of Polymer Crystallization by SAXS Experiments140**
 G. Hauser, J. Schmidtke, G. Strobl, and T. Thurn-Albrecht
- 10. Simultaneous In-Situ SAXS and WAXS Study of Crystallization and Melting Behavior of Metallocene Isotactic Poly(propylene)152**
 Patrick S. Dai, Peggy Cebe, Malcolm Capel, Rufina G. Alamo, and Leo Mandelkern
- 11. Lamellar Morphology of Narrow PEEK Fractions Crystallized from the Glassy State and from the Melt166**
 M. Dosière, C. Fournies, M. H. J. Koch, and J. Roovers
- 12. Real-Time Crystallization and Melting Study of Ethylene-Based Copolymers by SAXS, WAXD, and DSC Techniques187**
 Weidong Liu, Henglin Yang, Benjamin S. Hsiao, Richard S. Stein, Shengsheng Liu, and Baotong Huang
- 13. A Scattering Study of Nucleation Phenomena in Homopolymer Melts201**
 Anthony J. Ryan, Nicholas J. Terrill, and J. Patrick A. Fairclough
- 14. Crystallization and Solid-State Structure of Model Poly(ethylene oxide) Blends218**
 James Runt
- 15. Transient Rotator Phase Induced Nucleation in *n*-Alkanes232**
 E. B. Sirota and A. B. Herhold

COMPLEX FLUIDS AND BIOPOLYMERS

- 16. Highly Ordered Supramolecular Structures from Self-Assembly of Ionic Surfactants in Oppositely Charged Polyelectrolyte Gels244**
 Shuiqin Zhou, Fengji Yeh, Christian Burger, and Benjamin Chu
- 17. Some Thermodynamic Considerations of the Lower Disorder-to-Order Transition of Diblock Copolymers261**
 M. Pollard, O. K. C. Tsui, T. P. Russell, A. V. Ruzette, A. M. Mayes, and Y. Gallot
- 18. Analysis of the Structure, Interaction, and Viscosity of Pluronic Micelles in Aqueous Solutions by Combined Neutron and Light Scatterings270**
 Yingchun Liu and S-H Chen

19. **Optical Probe Study of Solutionlike and Meltlike Solutions of High Molecular Weight Hydroxypropylcellulose**.....297
Kiril A. Strelitzky and George D. J. Phillies
20. **SANS Studies of Polymers in Organic Solvents and Supercritical Fluids in the Poor, Theta, and Good Solvent Domains**.....317
Y. B. Melnichenko, E. Kiran, K. Heath, S. Salaniwal,
H. D. Cochran, M. Stamm, W. A. Van Hook, and G. D. Wignall
21. **Destruction of Short-Range Order in Polycarbonate-Ionomer Blends**.....328
Ryan Tucker, Barbara Gabrýs, Wojciech Zajac, Ken Andersen,
M. S. Kalhoró, and R. A. Weiss
22. **Scattering from Magnetically Oriented Microtubule Biopolymers**.....341
Wim Bras, Gregory P. Diakun, Richard C. Denny,
Anthony Gleeson, Claudio Ferrero, Yehudi K. Levine,
and J. Fernando Díaz

POLYMERS UNDER FLOW

23. **What Is a Model Liquid Crystalline Polymer Solution?: Solvent Effects on the Flow Behavior of LCP Solutions**356
S. Chidambaram, P. D. Butler, W. A. Hamilton,
and M. D. Dadmun
24. **X-ray Scattering Measurements of Molecular Orientation in Thermotropic Liquid Crystalline Polymers under Flow**374
Wesley R. Burghardt, Victor M. Ugaz, and David K. Cinader, Jr.
25. **X-ray Rheology of Structured Polymer Melts**390
Geoffrey R. Mitchell and Elke M. Andresen
26. **Phase Separation Kinetics during Shear in Compatibilized Polymer Blends**405
Alan I. Nakatani

BLOCK COPOLYMERS

27. **Ultra-Small-Angle X-ray Scattering and Transmission Electron Microscopy Studies Probing Grain Size of Lamellar Styrene-Butadiene Block Copolymers**.....436
Randall T. Myers, Alexander Karbach, Anuj Bellare,
and Robert E. Cohen

28. Block Crystallization in Model Triarm Star Block Copolymers with Two Crystallizable Blocks: A Time-Resolved SAXS-WAXD Study	448
G. Floudas, G. Reiter, O. Lambert, P. Dumas, F.-J. Yeh, and B. Chu	
29. Temperature- and Pressure-Induced Microphase Separation Transitions of a Polystyrene-<i>block</i>-Butadiene Copolymer Melt	456
W. De Odorico, H. Ladynski, and M. Stamm	
30. Ordering Kinetics between HEX and BCC Microdomains for SI and SIS Block Copolymers.....	470
Hee Hyun Lee and Jin Kon Kim	
31. SAXS and Rheological Studies on the Order-Disorder and Order-Order Transitions in Mixtures of Polystyrene-<i>b</i>-Polyisoprene-<i>b</i>-Polystyrene and Low Molecular Weight PS.....	496
Seung-Heon Lee and Kookheon Char	
32. Thermoreversible Order-Order Transition between Spherical and Cylindrical Microdomain Structures of Block Copolymer	514
Kohtaro Kimishima, Tadanori Koga, Yuko Kanazawa, and Takeji Hashimoto	

INDEXES

Author Index	532
Subject Index	534