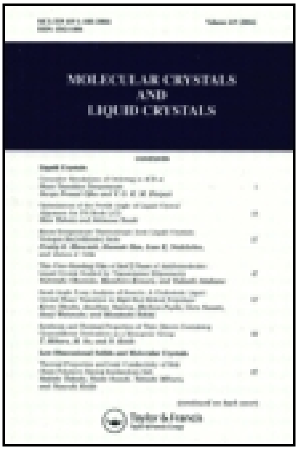
This article was downloaded by: [University of Haifa Library]
On: 13 August 2012, At: 20:28
Publisher: Taylor & Francis
Informa Ltd Registered in England and Wales Registered Number: 1072954
Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Molecular Crystals and Liquid Crystals

Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/gmcl20

Book Review

Version of record first published: 18 Oct 2010

To cite this article: (2002): Book Review, Molecular Crystals and Liquid Crystals, 381:1, 183-184

To link to this article: http://dx.doi.org/10.1080/714965453

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: http://www.tandfonline.com/page/terms-and-conditions

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae, and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

Mol. Cryst. Liq. Cryst., Vol. 381, pp. 183–184
Copyright © 2002 Taylor & Francis
1058-725X/02 $12.00 + .00
DOI: 10.1080/10587250290102882

Downloaded by [University of Haifa Library] at 20:28 13 August 2012

BOOK REVIEW

Introduction to Physical Polymer Science, by L. H. Sperling, 3rd Edition, Wiley-Interscience, John Wiley & Sons, Inc., New York, 2001; ISBN 0-471-32921-5; $94.95.

Introduction to Physical Polymer Science, by L. H. Sperling, has for many years served as an essential textbook in the graduate education of chemists and chemical engineers wishing to specialize in the field of polymer science. The text emphasizes polymer bulk physical characterization and assigns a brief overview to polymer synthesis; a topic treated almost exclusively by other excellent textbooks in the field [1]. With the success of the previous two editions of the text, the question arises as to whether the recently published third edition is necessary. The intended purpose of the new edition is to extend the discussions of the physical chemistry of polymer surfaces and interfaces as well as multicomponent polymer systems beyond those found in the previous edition.

Polymers are employed in increasingly complex applications where their surface chemical properties are equally as important as their bulk material properties. Examples range from the use of surface-active polymer solutions in enhanced oil recovery to the fabrication of organic semiconductor chip carriers, where improvements in polymer bulk dielectric properties and the introduction of low dielectric photoimageable multicomponent polymers cannot overstep the ability to metallize the surface of these materials. Today's specialists in polymer science must be familiar with techniques to both characterize and control the physical chemistry of polymer surfaces. Unfortunately, the new material in the third edition of Sperling's text only partly meets this need.

The list of surface characterization techniques originally found in the second edition of the text is expanded into a more detailed discussion of each technique in a new chapter devoted entirely to polymer surfaces and interfaces. A number of more recent techniques such as neutron reflectometry and surface probe microscopy are also included. In addition, a sufficiently thorough discussion of the thermodynamics of surfaces is given such that surface segregation and interface formation in polymer blends may be understood and predicted from surface tension data. However, the practical difficulties associated with the experimental determination of

Downloaded by [University of Haifa Library] at 20:28 13 August 2012

solid surface tensions and the role of surface chemical heterogeneity and morphology are only hinted at. In addition, methods which may be employed to modify and control polymer surface chemistry and morphology are not discussed. Perhaps such a gap is arguably consistent with a text that concentrates on physical chemistry rather than synthesis. However, George Whitesides' seminal work [2] on polymer surface modification should have been at least referenced and would have led naturally to a discussion of the effects of surface chemical heterogeneity on both surface tension and adsorption.

The new chapter on multicomponent systems such as polymer blends and composites offers more detailed discussions on how morphology and properties may be altered than is the case with the chapter on polymer surfaces. Unfortunately, the use of polymer-surfactant complexes to create similar materials is not discussed. Finally, the chapter on modern polymer topics has been updated to include brief presentations of important subjects such as dendritic polymers and supercritical fluids processing.

Despite the limitations of the new material introduced in the third edition, the book retains its traditional strength as an excellent introduction to the bulk physical chemistry of polymeric materials. If supplemented by references on polymer surface heterogeneity and modification, the text will continue to serve the needs of graduate students in the increasingly complex and multidisciplinary field of polymer science.

REFERENCES

[1] Flory, P. J. (1953). ***Principles of polymer chemistry***, Ithaca, NY: Cornell University.
[2] Holmes-Farley, S. R., Bain, C. D., & Whitesides, G. M. (1988). ***Langmuir***, *4*, 921–937.

A. P. Angelopoulos
Center for Advanced Materials
Department. Of Chemistry
University of Massachusetts Lowell
Lowell, MA 01854-5046
E-mail: anastasios_angelopoulos@uml.edu