

Book Review

Vibrational Spectroscopy of Polymers: Principles and Practice
Edited by Neil J. Everall (ICI Measurement Science Group, Wilton, U.K.), John M. Chalmers (VS Consulting, Stokesley, U.K.), and Peter R. Griffiths (University of Idaho, Moscow, ID). John Wiley & Sons, Ltd: Chichester. 2007. xii + 574 pp. \$260. ISBN 978-0-470-01662-6.

Peter Pulay

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Vibrational Spectroscopy of Polymers: Principles and Practice. Edited by Neil J. Everall (ICI Measurement Science Group, Wilton, U.K.), John M. Chalmers (VS Consulting, Stokesley, U.K.), and Peter R. Griffiths (University of Idaho, Moscow, ID). John Wiley & Sons, Ltd: Chichester. 2007. xii + 574 pp. \$260. ISBN 978-0-470-01662-6.

This book is a collection of 17 articles dealing with all aspects of vibrational spectroscopy of polymers, once the most widely used method for the spectroscopic characterization of these materials. Newer methods, such as NMR, mass spectrometric, and X-ray diffraction techniques have somewhat eroded this position. Nevertheless, vibrational spectroscopy still retains an edge in a number of cases. It can be applied to virtually any sample, and the high sensitivity of infrared spectroscopy allows measurements at high spatial or temporal resolution that other, less sensitive methods cannot handle. There is some overlap between the individual chapters, but this is normal and unavoidable for a multiauthor volume. It may even be helpful for someone who does not want to read the whole book. Each chapter has its own references.

The introductory chapter by Everall and Chalmers, two of the editors, provides an excellent overview of polymer vibrational spectroscopy, including a number of practical aspects. The remaining chapters cover most aspects of the technique as applied to polymers: e.g., experimental techniques, including newer methods, a wealth of practical examples, and also theory. The topics range from empirical identification of structural motifs, to determination of crystallinity and phase transitions, to depth profiling, polymers for solar collectors, and vibrational spectroscopy of composite (filled) polymers and rubbers, etc. A number of polymers are strongly oriented, and dichroic (and even trichroic) measurements and changes in orientation under mechanical stress are covered in several chapters. There is also a chapter on the basic theory of the vibrational spectra of polymeric materials. Most of the book focuses on traditional polymers, but the last two chapters are devoted to conducting polymers and polymer-based electronic devices.

Overall, this is an excellent summary of the current state-of-the-art of the application of vibrational spectroscopy to the

study of polymeric systems. It has a large number of references, which are generally up-to-date.

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Environmental Radiochemical Analysis III. Edited by Peter Warwick (Loughborough University, U.K.). Royal Society of Chemistry: Cambridge. 2007. x + 220 pp. \$209.00. ISBN 978-0-85404-263-0.

This book features the proceedings of The 10th Environmental Radiochemical Analysis Symposium of the Royal Society of Chemistry held in September 2006 in Oxford and covers a number of topics in this area, such as new methods in radioanalyses, measurements of radioactivity in a variety of environmental sources, hazard assessment, and use of software in and advancements in instrumentation for measurements, to name a few. There are 26 chapters, a sampling of which includes "Environmental Measurements of Radioxenon"; "Improvements in Underground Gamma-Ray Spectrometry and the Application of Measuring Radioactivity in Agricultural Samples"; and "The Chemistry of Ultra-Radiopure Materials". The book concludes with an isotope index and a subject index.

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Characterization and Analysis of Polymers. Edited by the staff at Wiley. John Wiley & Sons, Inc.: Hoboken, NJ. 2008. x + 978 pp. \$295.00. ISBN 978-0-470-23300-9.

This multiauthor reference comprises selected reprints from the third edition of Wiley's *Encyclopedia of Polymer Science and Technology*. Various techniques used to characterize the physical and chemical properties of polymers are discussed in 26 chapters, which are grouped into the following sections: Introduction; Composition, Molar Mass and Molar Mass Distribution; Structure and Morphology; and Molecular Organization and Dynamics. An extensive subject index completes the book.

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