Vasilis G. Gregoriou, Mark S. Braiman (Eds.), Vibrational Spectroscopy of Biological and Polymeric Materials, CRC Press, Boca Raton, FL, USA, 2006 (xi+430 pp., £79-99, ISBN 1-57444-539-1)

Vibrational spectroscopy is used primarily for characterising polymers and biological systems. Vibrational spectroscopy continues to uncover structural information pertinent to a growing number of applications. *Vibrational Spectroscopy of Biology and Polymeric Materials* compiles the latest developments in advanced infrared red and Raman spectroscopic techniques that are applicable to both polymeric material and biological compounds. It consists of eight chapters which cover varies aspects of Vibrational spectroscopy.

Understanding the structure and property relationships encountered in liquid crystalline segmented copolymer systems is fundamental to establishing and exploiting the potential of the material for technological applications. Fourier transform infrared spectroscopy is a very powerful tool for studying liquid crystalline polyurethanes (Chapter 1). A key issue in structural engineering is determining the state of stress in structural materials during service. In both single and multiple fibre composite materials Raman spectroscopy is used to measure stress and strain (Chapter 2). The study of ultra thin biological and polymeric material using Vibrational spectroscopy is presented in Chapter 3. A two-dimensional correlation spectroscopy is a new spectral analysis method, which can be used in an array of applications to both polymeric material and biological compounds (Chapter 4). Raman and infrared spectroscopy have provided molecular characterisation of complex assemblies and the ability to reconstruct a sample image visualising the spatial distribution of chemical components (Chapter 5). Vibrational circular dichroism is a measurement of the differential absorption of the left and right circularly polarized light by molecular vibrational transition in the infrared region of the spectrum (Chapter 6). Understanding the functional mechanism of any biological macromolecule requires atomic resolution characterisation of both its three-dimensional structure and the nature of its conformational changes (Chapter 7). The final character focuses on the application of time resolved FT-IR spectroscopy to biological material.

The book is an ideal and practical reference in the analysis and integration of biological and polymeric materials. The book is designed for researchers, students, analytical chemists and engineers.

John F. Kennedy *
Zaheera Parveen
Chembiotech Laboratories,
Institute of Research & Development,
University of Birmingham Research Park,
Birmingham B15 2SQ, UK

Available online 4 December 2006

* Corresponding author.
doi:10.1016/j.carbpol.2006.09.013

G.H. Michler, F.J. Baltá-Calleja (Eds.), Mechanical Properties of Polymers Based on Nanostructure and Morphology, CRC Press, Taylor and Francis Group, Boca Raton, FL, USA, 2005 (xxii+760 pp., £97.00, ISBN 1-57444-771-8)

Polymers are ubiquitous organic materials, which exist in the world. Except of that they create alive organisms, they have implications relevant to industrial, medical and household applications. Therefore, a continuous goal of polymer research focuses on the improvement of their properties in general and the better fitting of specific properties to defined applications. Profound understanding of the multiple dependence between molecular structure, morphology, polymerization and processing methods, ultimate mechanical properties of polymers are necessary to discover higher quality materials. Moreover, new classes of materials have appeared: the so-called nanostructured polymers, nanopolymers or nanocomposites, which have structural size below 100 nm. Nowadays, we can investigate so small a system by means of sophisticated techniques. This in turn promises to open up ways to improve their properties such as stiffness, strength or toughness that might result in better quality materials.

"Mechanical Properties of Polymers Based on Nanostructure and Morphology" is a three-part volume, which focuses on selected results concerning the mechanical properties of polymers as derived from the improved knowledge of their structures at the μm- and nm-scale as well as from the interactions between the complex hierarchical structures and functional requirements. Polymer morphology is mostly concerned with crystalline polymers, partly because of their rich record but also because the two most economically important synthetic polymers, polyethylene and polypropylene. The main aspects of the morphology of semicrystalline polymers, as revealed by electron microscopy and X-ray scattering techniques are highlighted in the first part, which contains structural and morphological characterization.

The deformation and fracture behaviour of polymers depends on different reasons. The mechanical strength of an isotropic thermoplastic polymer derives primarily from de van der Waals attraction between chain segments. Moreover, strength and toughness depend on the molecular properties of the chosen material, on molecular packing (e.g. density, phase structure, micro-morphology), on the way stresses are transmitted between them (e.g. through cross-links, entanglements or cohesive forces) and on the nature and intensity of relaxation mechanisms. Thus, describing the main micro- and nanomicroscopic effects and mechanisms occurring in different classes of polymers is the aim of the second part of volume.

Nanocomposites, nanoparticles which have a nanometer scale of size, have been produced industrially for more than half a century. New aspects of manufacturing, structure development and properties of practical relevance in nano-particle-filled thermoplastic polymers are given in the third part of the book. The ideal carbon nanotube (CNT) is a small particle that can be regarded as a graphite plane rolled up to a tube with hemispherical cap at each end. The hexagonal structure, which is known from graphite sheets and carbon fibers, provides them with a high strength and stiffness at low density. Therefore, the art of carbon nanotube and nanofiber reinforced polymer systems is also described in the third part devoted generally to mechanical properties improvement and fracture behaviour.

This book offers the most current perspective recent research and results of scientists' works. It also explores the improvement of mechanical properties, such as strength and toughness, and physical properties such as heat resistance and conductivity. This book is directed particularly at polymer scientists in research institutes and in industry, but it might be also helpful for students of polymer physics, chemistry and engineering.

John F. Kennedy *
Katarzyna Bunko
Chembiotech Laboratories,
Institute of Research and Development,
University of Birmingham Research Park,
Birmingham B15 2SQ, UK

Available online 8 December 2006

* Corresponding author.
doi:10.1016/j.carbpol.2006.09.019

Thomas J. Bruno, Paris D.N. Svoronos, CRC Handbook of Fundamental Spectroscopic Correlation Charts, CRC Press, Boca Raton, FL, USA, 2006 (vi+225 pp., £99-95, ISBN 0-8493-3250-8)

From forensics and security to pharmaceuticals and environmental applications, spectroscopic detection is one of the most cost-effective methods for identifying chemical compounds in a wide range of disciplines. For spectroscopic information, correlation charts are far more easily used than tables.

The Handbook of Fundamental Spectroscopic Correlation Charts provides useful analysis and assignment of spectra and structural elucidation of organic and organometallic molecules. The correlation charts are compiled from an extensive search of spectroscopic literature and contain current, detailed information that includes new results for many compounds.

This book also presents graphical data charts for nuclear magnetic resonance spectroscopy of the most useful nuclei, as well as infrared and ultraviolet spectrophotometry. Because mass spectrometry data is not best represented graphically, it is commonly used to present it in tabular form. Furthermore, mass spectrometry can be used for analyses and structural determinations in combination with other techniques.

To present absorption bands and intensities for variety of important functional groups and chemical families, this book also concentrates on instrument calibration, diagnostics, common solvents, fragmentation patterns and several conversion tables.

Laboratory safety is one of the last, but not least subject discussed in the handbook. As incapability between some chemicals may cause fire, explosion, or release of toxic gases, this book gives list of chemicals that react in certain chemical environments. What is more, it also provides useful information about abbreviations that are commonly encountered in presentations of laboratory and industrial hazards.

In conclusion, Handbook of Fundamental Spectroscopic Correlation Charts is an ideal laboratory companion for students and professionals in academic, industrial and government laboratories.

John F. Kennedy *
Agnieszka Kaczmarek
Chembiotech Laboratories,
Institute of Research and Development,
University of Birmingham Research Park,
Birmingham B15 2SQ, UK

Available online 11 December 2006

* Corresponding author.
doi:10.1016/j.carbpol.2006.09.018

Anilkumar G. Gaonkar, Andrew McPherson (Eds.), Ingredient Interactions: Effects on Food Quality, second edition, CRC Press, Boca Raton, FL, USA, 2006 (xvii+554, £79-99, ISBN 0-8247-5748-3)

Understanding the interactions among ingredients in food is critical for optimising ingredient performance and obtaining quality food products. Some ingredient' interactions are desirable and can positively affect food quality, but some of them need to be controlled in order not to spoil the food texture and taste.

The main components of food can be classified as macrocomponents (water, proteins, lipids, carbohydrates) and microcomponents (minerals, vitamins, enzymes). Interaction can take place between macrocomponents or between macro- and microcomponents. What is more, physical conditions such as pH, temperature, moisture and time affect intensity of reactions. To study those complex ingredient' interactions in food systems, both microscopic analysis and rheology can be employed. The use of the microscope has become recognised as an essential technique to reveal the relationship between structure and