

Book Review

**Metal-Polymer Nanocomposites Edited by Luigi Nicolais and Gianfranco Carotenuto (National Research Council, Naples, Italy). John Wiley & Sons, Inc.: Hoboken, NJ. 2005. xiv + 300 pp. \$99.95. ISBN 0-471-47131-3.**

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As research on inorganic nanoparticles continues to expand, an important area of development will be incorporating these nanoparticles into robust solid matrixes that are functionally compatible with the desired properties of nanoparticles. Polymers represent the most promising and versatile class of matrixes for this purpose. *Metal-Polymer Nanocomposites* provides a nice introduction to this area of study, with specific focus on zerovalent metal clusters and nanoparticles. The co-editors are both prolific researchers whose activities cover a broad range of research in composite materials. The subject matter is highly interdisciplinary, and the book covers diverse aspects of metal-polymer nanocomposites ranging from synthesis to physico-chemical properties.

Overall, the book emphasizes the optical and magnetic properties of the metal particles rather than the properties of the polymer matrixes. Indeed, the first chapter is a general introduction to research on metal nanoparticles that focuses on metal sols rather than on polymer nanocomposites. In addition, the sixth chapter is a general theoretical treatment of plasmon absorption of metal nanoparticles, and the final chapter is a discussion of optical anisotropy. These chapters provide a useful introduction for scientists interested in the study of metal

nanoparticles, regardless of any interest in polymer matrixes; however, they do not highlight recent advances in the field of metal-polymer nanocomposites.

Recent advances are addressed in other portions of the book. These include magneto-optical properties, microscopic characterization, and new developments in the synthesis of metal-polymer nanocomposites. Among the synthetic methods covered, cryochemical methods, thermolysis, polymer nanoreactor approaches, ex-situ methods, and ion implantation are all recounted in detail. In addition, research on magneto-optical properties of these nanocomposites is treated at length, along with a discussion of the implications for new materials for storing data. On the other hand, some other important areas of application are given relatively little attention. For example, applications of sensors, ferroelectric properties, and catalytic activities are mentioned in a section devoted to metal/poly-*p*-xylylene composites. However, these important aspects are not fully developed with respect to the broader class of materials.

Overall the book is well-written, and it covers concisely the physics and chemistry of metal-nanoparticle inclusions in polymer matrixes. It is highly recommended for any researchers who would like to begin working in this field or for active researchers in polymer composites who would like to expand their research to include metal nanoparticles.

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