

Preface

Nanocomposites are a special type of composite structure in which at least one of the phases has one or more dimensions on the order of nanometers. This new class of materials can be designed to meet various functions, often at the same time, and their properties are in many cases superior to those of conventional microscale composites. Therefore, recent years have seen a constantly growing interest in these materials, their preparation, processing, and application. Among the synthesis techniques, sol-gel is certainly one of the most attractive because it is very versatile, allowing the researcher to obtain both the matrix and the filler of the nanocomposite, and to chemically adjust the interface to optimize structure and properties.

Although the topic of nanocomposites is extensively discussed in the literature, and several books have already been published, they mainly address polymer nanocomposites. This book specifically describes Sol-Gel Nanocomposites in which at least one of the phases is obtained by the sol-gel method. The book covers the synthesis and characterization of different types of nanocomposites, which are composed of polymeric, inorganic, or hybrid organic–inorganic matrices with various fillers. It describes the specific problems related to the formulation of nanocomposite films and bulks, offers a specific chapter devoted to modeling and simulation, and presents examples of applications in the field of coatings and biomaterials. The book follows a didactic approach, describing each topic from a fundamental point of view, with significant examples and case studies. In all chapters, an emphasis is placed on the scientific principles that are the basis for nanocomposite synthesis and application. Therefore, the editors' efforts will be rewarded if readers derive a general and up-to-date understanding of the subject, and the motivation to expand on the theoretical and experimental studies that form the basis of exciting new products.

The editors wish to thank the chapter authors for their contributions and cooperation. Our editor at Springer, Sara Kate Heukerott, is also greatly thanked for her help, patience, and understanding.



<http://www.springer.com/978-1-4939-1208-7>

Sol-Gel Nanocomposites

Guglielmi, M.; Kickelbick, G.; Martucci, A. (Eds.)

2014, IX, 227 p. 145 illus., 9 illus. in color., Hardcover

ISBN: 978-1-4939-1208-7