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Introduction to Polymer–Clay Nanocomposites

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To my daughter and son

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Preface

Nowadays, polymer–clay nanocomposite materials are of great interest in terms of scientific research and industrial applications. This book has been written to present a new practical overview of polymer–clay nanocomposites from a different perspective by offering a comprehensive introduction devoted to the typical characteristics of polymers, clays, and organo clays.

In this context, the first two chapters are devoted to polymers, polymerization mechanisms, and clay and characterization techniques. The second chapter examines predominantly the surface chemistry of the modifications with the main mechanisms of surface modification of the clay. Hence, this chapter starts with concise information describing the interface phenomenon and ends with a comprehensive analysis of interfacial characteristics of organoclay synthesized by considering adsorption and the other modification mechanisms.

Organoclays have critical importance not only in the creation of new materials and applications in materials science but also in the preparation of polymer nanocomposites, which is one of the most developed fields of nanotechnology. Therefore, the third chapter encloses synthesis methods of organoclay and the numerous related research results.

The fourth chapter is predominantly focused on the synthesizing methods of polymer–clay nanocomposites along with the structural, thermal, and mechanical characterization techniques of these composites.

Finally, in the fifth chapter, a wide range of industrial and technological applications of polymer–clay nanocomposite materials are proposed with their numerous practical examples.

To sum up, this book, which focuses on clay-reinforced polymer composites, can be regarded as a detailed review of adsorptive interactions in particular and other interparticle interactions facilitating the synthesis of organoclay, including the interactions between ions and functional groups in the interlayer region.

I believe that this book containing original figures, schemas, and numerous relevant references in each chapter would be an essential reference source for the readers working on the research and development of polymer–clay nanocomposites.

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Erzurum, Turkey
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