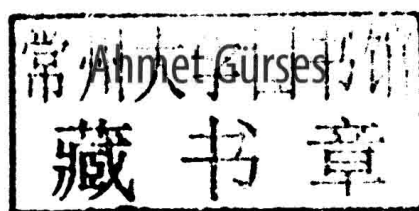


Ahmet Gürses

Introduction to Polymer–Clay Nanocomposites



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To my daughter and son

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.

I wish to thank my colleagues, particularly Dr. Kübra Güneş, and Dr. Metin Açıkyıldız, Zafer Eroğlu, and Büşra Kuzey for their support in checking the text, drawing figures and schemas, and creating equations.

Ahmet Gürses
Erzurum, Turkey
Summer, 2015

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Contents

<i>Preface</i>	xiii
<i>Acknowledgment</i>	xv
1. Polymers and Polymer Synthesis	1
1.1 Introduction	1
1.1.1 Historical Developments	2
1.1.2 Classifications of Polymers	4
1.1.2.1 Based on origin	5
1.1.2.2 Based on the configuration	6
1.1.3 Structures and Properties of Polymers	7
1.1.3.1 Polyethylene	7
1.1.3.2 Polypropylene	8
1.1.3.3 Poly(methyl methacrylate)	9
1.1.3.4 Polystyrene	9
1.1.3.5 Poly(vinyl chloride)	11
1.1.3.6 Poly(vinyl acetate)	12
1.1.3.7 Poly(vinyl alcohol)	12
1.1.3.8 Engineering polymers	13
1.1.3.9 Nylons	14
1.1.3.10 Epoxy resins	15
1.1.3.11 Phenol formaldehyde resins	16
1.1.3.12 Amino resins	18
1.1.3.13 Polytetrafluoroethylene	19
1.1.3.14 Polyurethanes	19
1.1.3.15 Poly(ether ether ketone)	21
1.1.3.16 Silicones	21
1.1.4 Natural Polymers	22
1.1.4.1 Cellulose	22
1.1.4.2 Starch	23
1.1.4.3 Natural rubber	23
1.1.4.4 Proteins	25
1.1.4.5 Poly-3-hydroxybutyrate	26
1.2 Polymerization Reactions	26
1.2.1 Step-Growth Polymerization	27
1.2.1.1 Typical step-growth polymers	29
1.2.2 Chain Polymerization	40

1.2.2.1	Initiation	41
1.2.2.2	Propagation	43
1.2.2.3	Termination	43
1.2.2.4	Chain transfer	44
1.2.3	Diene Polymerization	45
1.2.4	Practical Methods of Chain Polymerization	47
1.2.4.1	Bulk polymerization	47
1.2.4.2	Solution polymerization	48
1.2.4.3	Suspension polymerization	49
1.2.4.4	Emulsion polymerization	49
1.2.5	Ionic and Coordination Polymerizations	50
1.2.5.1	Cationic polymerization	51
1.2.5.2	Anionic polymerization	52
1.2.5.3	Coordination polymerization	53
1.2.6	Ring-Opening Polymerization	54
1.2.6.1	Poly(propylene oxide)	55
1.2.6.2	Epoxy resins	56
1.2.6.3	Polycaprolactam (nylon-6)	56
1.3	Properties of Polymers	59
1.3.1	Mechanical Properties	59
1.3.1.1	Mechanical tests	61
1.3.2	Thermal Properties	66
1.3.2.1	Glass transition temperature	66
1.4	Polymer Characterization	69
1.4.1	Nuclear Magnetic Resonance	69
1.4.2	Infrared Spectroscopy	70
1.4.3	Thermogravimetric Analysis	70
1.4.4	Differential Scanning Calorimetry	71
1.4.5	X-Ray Diffraction	71
1.4.6	Optical Microscopy	72
1.4.7	Dynamic Mechanical Analysis	73
2.	Clay Minerals, Surface Chemistry of Clays and Organoclays, and the Mechanisms of Organoclay Synthesis	87
2.1	Introduction	87
2.2	Clay Minerals	88
2.2.1	Structure of Clay Minerals	89

2.2.2	Classification of Clay Minerals	91
2.2.2.1	The 1:1 layer type	91
2.2.2.2	The 2:1 layer type	94
2.2.3	Characterization Techniques of Clay Minerals	101
2.2.3.1	X-ray diffraction	101
2.2.3.2	Nuclear magnetic resonance spectroscopy	102
2.2.3.3	Thermal analysis	103
2.2.3.4	Fourier transform infrared spectroscopy	103
2.2.3.5	Electron and scanning probe microscopy	104
2.3	Surface Chemistry of Clay and Organoclays	106
2.3.1	Adsorption at the Clay-Liquid Interface and Chemical Grafting	115
2.3.2	Mechanisms of Adsorption and Aggregation	115
2.3.2.1	Ion exchange	122
2.3.2.2	Ion pairing	125
2.3.2.3	Acid-base interaction and either hydrogen bonding between substrate and adsorbate or Lewis acid-Lewis base reaction	125
2.3.2.4	Adsorption by polarization of π electrons	127
2.3.2.5	Adsorption by dispersion forces	127
2.3.2.6	Hydrophobic bonding	129
2.3.3	Organoclay Structures	144
3.	Organoclay Synthesis Methods	191
3.1	Introduction	191
3.2	Synthesis of Organoclays	195
3.2.1	Cation Exchange	195
3.2.2	Solid-State Interaction	199
3.3	Quaternary Alkylammonium Cations Used to Prepare Organoclays	200
3.4	Applications of Organoclays as Sorbents	222

3.4.1	Aromatic Compounds	222
3.4.1.1	Phenol and its derivatives	223
3.4.1.2	Trichloroethylene	224
3.4.1.3	Pesticides and herbicides	224
3.4.1.4	Anionic contaminants	225
4.	Polymer–Clay Nanocomposite Synthesis Methods	239
4.1	Introduction	239
4.2	Types of Polymer–Clay Nanocomposites	241
4.3	Preparation of Polymer–Clay Nanocomposites	244
4.3.1	Template Synthesis (Sol–Gel Technology)	244
4.3.2	Solution Intercalation	246
4.3.3	In situ Intercalative Polymerization	248
4.3.3.1	Thermoplastic nanocomposites	250
4.3.3.2	Thermoset nanocomposites	251
4.3.3.3	Rubber-modified epoxy nanocomposites	252
4.3.4	Melt Intercalation	252
4.3.4.1	Thermoplastic nanocomposites	254
4.3.4.2	Elastomer nanocomposites	254
4.4	Characterization of Polymer–Clay Nanocomposites	256
4.4.1	X-Ray Diffraction	256
4.4.2	Transmission Electron Microscopy and Scanning Electron Microscopy	258
4.4.3	Atomic Force Microscopy	261
4.4.4	Differential Scanning Calorimetry and Thermogravimetric Analysis	261
4.4.5	Fourier Transform Infrared Spectroscopy	262
4.4.6	Nuclear Magnetic Resonance	263
4.4.7	Energy-Dispersive X-Ray Spectroscopy	263
4.4.8	Small-Angle X-Ray Scattering	264
4.4.9	Cone Calorimeter	264
4.4.10	Mass Loss Calorimeter	266

4.5	Properties of Polymer–Clay Nanocomposites	266
4.5.1	Mechanical Properties	267
4.5.2	Thermal Properties	269
4.5.3	Flame Retardancy	270
4.5.4	Barrier Properties	271
4.5.5	Anticorrosive Properties	273
4.5.6	Chemical Properties of Polymer–Silicate Nanocomposites	273
5.	Applications of Polymer–Clay Nanocomposites	293
5.1	Introduction	293
5.2	Food Packing	294
5.3	Biomedical Applications	300
5.3.1	Drug Delivery Applications	307
5.3.2	Tissue Engineering and Repair	310
5.3.3	Hydrogels with Biomedical Potential	313
5.4	Wastewater Pretreatment	314
5.5	Electricals/Electronics, Optoelectronics, Sensors, and Automobiles	317
5.6	Other Uses	321
5.6.1	Engineering Plastics	321
5.6.2	Polyester Cloth or Film	321
5.6.3	Reinforcing Plastics	321
5.6.4	Functionalized Plastics and Fibers	322
5.6.5	UHMWPE–MMT Nanocomposite Plastics	323
5.6.6	Polypropylene-Layered Silicate Nanocomposite Films	323
5.6.7	PP–Silica Nanoprecursor Films	324
	<i>Index</i>	339

