1. Record Nr. UNINA9910808340503321

Titolo	Characterization techniques for polymer nanocomposites / / edited by Vikas Mittal
Pubbl/distr/stampa	Weinheim, : Wiley-VCH, c2012
ISBN	9786613640475 9783527654529 3527654526 9781280663543 1280663545 9783527654505 352765450X 9783527654536 3527654534
Edizione	[1st ed.]
Descrizione fisica	1 online resource (380 p.)
Collana	Polymer nano-, micro- & macrocomposites
Altri autori (Persone)	MittalVikas
Disciplina	620.192
Soggetti	Polymer composites Nanostructured materials Fillers (Materials) - Surfaces Nanotechnology Composite materials Surfaces
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Characterization Techniques for Polymer Nanocomposites; Contents; Preface; List of Contributors; 1: Characterization of Nanocomposite Materials: An Overview; 1.1 Introduction; 1.2 Characterization of Morphology and Properties; 1.3 Examples of Characterization Techniques; References; 2: Thermal Characterization of Fillers and Polymer Nanocomposites; 2.1 Introduction; 2.2 TGA of Fillers; 2.2.1 Quantification of the Extent of Surface Modification; 2.2.2 Cleanliness of the Filler Surface; 2.2.3 Comparing the Stability of Different Fillers; 2.2.4 Dynamic TGA Analysis of the Fillers

2.2.5 Characterization of the Surface Reactions2.2.6 Different Measurement Environments; 2.2.7 Correlation of Organic Matter with Basal Spacing; 2.3 TGA of Polymer Nanocomposites; 2.3.1 Effect of Filler Concentration; 2.3.2 Effect of Compatibilizer; 2.4 DSC of Fillers; 2.4.1 Thermal Transitions in the Modified Fillers; 2.5 DSC of Composites; 2.5.1 Transitions in Composites; 2.5.2 Optimization of Curing Conditions; References; 3: Flame-Retardancy Characterization of Polymer Nanocomposites; 3.1 Introduction; 3.2 Types of Flame-Retardant Nanoadditives; 3.2.1 One-Dimensional Nanomaterials 3.2.1.1 Montmorillonite Clay3.2.1.2 Nanographene Platelets; 3.2.2 Two-Dimensional Nanomaterials; 3.2.2.1 Carbon Nanofibers; 3.2.2.2 Carbon Nanotubes; 3.2.2.3 Halloysite Nanotubes; 3.2.3 Three-Dimensional Nanomaterials; 3.2.3.1 Nanosilica; 3.2.3.2 Nanoalumina; 3.2.3.3 Nanomagnesium Hydroxide; 3.2.3.4 Polyhedral Oligomeric Silsequioxanes; 3.3 Thermal, Flammability, and Smoke Characterization Techniques; 3.3.1 Introduction to Test Methods; 3.3.2 Thermogravimetric Analysis (TGA); 3.3.3 The UL 94 Vertical Flame Test; 3.3.4 Oxygen Index (Limiting Oxygen Index) (ASTM D2863-97) 3.3.5 Cone Calorimeter (ASTM E 1354)3.3.6 Microscale Combustion Calorimeter (ASTM D 7309); 3.3.7 Steiner Tunnel Test (ASTM E 84); 3.4 Thermal and Flame Retardancy of Polymer Nanocomposites; 3.4.1 One-Dimensional Nanomaterial-Based Nanocomposites; 3.4.1.1 Polymer-Clay Nanocomposites; 3.4.1.2 Polymer-Graphene Nanocomposites; 3.4.2 Two-Dimensional Nanomaterial-Based Nanocomposites; 3.4.2.1 Polymer Carbon Nanofiber Nanocomposites; 3.4.2.2 Polymer Carbon Nanotube Nanocomposites; 3.4.2.3 Polymer Halloysite Nanotube Nanocomposites; 3.4.3 Three-Dimensional Nanomaterial-Based Nanocomposites
3.4.3.1 Polymer Nanosilica Nanocomposites3.4.3.2 Polymer Nanoalumina Nanocomposites; 3.4.3.3 Polymer Nanomagnesium Hydroxide Nanocomposites; 3.4.3.4 Polymer POSS Nanocomposites; 3.4.4 Multicomponent FR Systems: Polymer Nanocomposites Combined with Additional Materials; 3.4.4.1 Polymer-Clay with Conventional FR Additive Nanocomposites; 3.4.4.2 Polymer-Carbon Nanotubes with Conventional FR Additive Nanocomposites; 3.4.4.3 Polymer-Clay and -Carbon Nanotubes with Conventional FR Additive Nanocomposites; 3.5 Flame Retardant Mechanisms of Polymer Nanocomposites
3.6 Concluding Remarks and Trends of Polymer Nanocomposites

Sommario/riassunto

With its focus on the characterization of nanocomposites using such techniques as x-ray diffraction and spectrometry, light and electron microscopy, thermogravimetric analysis, as well as nuclear magnetic resonance and mass spectroscopy, this book helps to correctly interpret the recorded data. Each chapter introduces a particular characterization method, along with its foundations, and makes the user aware of its benefits, but also of its drawbacks.As a result, the reader will be able to reliably predict the microstructure of the synthesized polymer nanocomposite and its thermal and mecha