

1. Record Nr.	UNINA9910143404803321
Titolo	Flame retardant polymer nanocomposites [[electronic resource] /] / edited by Alexander B. Morgan, Charles A. Wilkie
Pubbl/distr/stampa	Hoboken, N.J., : Wiley-Interscience, c2007
ISBN	1-280-83915-5 9786610839155 0-470-10903-3 0-470-10902-5
Descrizione fisica	1 online resource (451 p.)
Altri autori (Persone)	MorganAlexander B WilkieC. A (Charles A.)
Disciplina	628.9223
Soggetti	Fire resistant polymers Nanostructured materials Polymeric composites Electronic books.
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	FLAME RETARDANT POLYMER NANOCOMPOSITES; CONTENTS; Contributors; Preface; Acronyms; 1 Introduction to Flame Retardancy and Polymer Flammability; 1.1 Introduction; 1.2 Polymer Combustion and Testing; 1.2.1 Laboratory Flammability Tests; 1.2.2 Polymer Combustion; 1.3 Flame Retardancy; 1.3.1 General Flame Retardant Mechanisms; 1.3.2 Specific Flame Retardant Mechanisms; 1.3.3 Criteria for Selection of Flame Retardants; 1.3.4 Highly Dispersed Flame Retardants; 1.4 Conclusions and Future Outlook; References; 2 Fundamentals of Polymer Nanocomposite Technology; 2.1 Introduction 2.2 Fundamentals of Polymer Nanocomposites2.2.1 Thermodynamics of Nanoscale Filler Dispersion; 2.2.2 Synthetic Routes for Nanocomposite Formation; 2.2.3 Dispersion Characterization: Common Techniques and Limitations; 2.3 Effects of Nanofillers on Material Properties; 2.3.1 Effects on Polymer Crystallization; 2.3.2 Effects on Mechanical Properties; 2.3.3 Effects on Barrier Properties; 2.4 Future Outlook; References; 3 Flame Retardant Mechanism of Polymer-Clay

Nanocomposites; 3.1 Introduction; 3.1.1 Initial Discoveries; 3.2 Flame Retardant Mechanism; 3.2.1 Polystyrene Nanocomposites 3.2.2 Polypropylene-Clay Nanocomposites 3.2.3 Thermal Analysis of Polymer-Clay Nanocomposites; 3.3 Conclusions and Future Outlook; References; 4 Molecular Mechanics Calculations of the Thermodynamic Stabilities of Polymer-Carbon Nanotube Composites; 4.1 Introduction; 4.2 Background and Context; 4.3 Description of the Method; 4.4 Application to PS-CNT Composites; 4.5 Uncertainties and Limitations; 4.6 Summary and Conclusions; References; 5 Considerations Regarding Specific Impacts of the Principal Fire Retardancy Mechanisms in Nanocomposites; 5.1 Introduction 5.2 Influence of Nanostructured Morphology 5.2.1 Intercalation, Delamination, Distribution, and Exfoliation; 5.2.2 Orientation; 5.2.3 Morphology During Combustion or Barrier Formation; 5.3 Fire Retardancy Effects and Their Impact on the Fire Behavior of Nanocomposites; 5.3.1 Inert Filler and Char Formation; 5.3.2 Decomposition and Permeability; 5.3.3 Viscosity and Mechanical Reinforcement; 5.3.4 Barrier for Heat and Mass Transport; 5.4 Assessment of Fire Retardancy; 5.4.1 Differentiated Analysis with Regard to Different Fire Properties 5.4.2 Different Fire Scenarios Highlight Different Effects of Nanocomposites 5.5 Summary and Conclusions; References; 6 Intumescence and Nanocomposites: a Novel Route for Flame-Retarding Polymeric Materials; 6.1 Introduction; 6.2 Basics of Intumescence; 6.3 Zeolites as Synergistic Agents in Intumescent Systems; 6.4 Intumescent in Polymer Nanocomposites; 6.5 Nanofillers as Synergists in Intumescent Systems; 6.6 Critical Overview of Recent Advances; 6.7 Summary and Conclusion; References 7 Flame Retardant Properties of Organoclays and Carbon Nanotubes and Their Combinations with Alumina Trihydrate

---

## Sommario/riassunto

Flame Retardant Polymer Nanocomposites takes a comprehensive look at polymer nanocomposites for flame retardancy applications and includes nanocomposite fundamentals (theory, design, synthesis, characterization) as well as polymer flammability fundamentals with emphasis on how nanocomposites affect flammability. The book has practical examples from literature, patents, and existing commercial products. Readers can design new work based upon the material in the book or use it as a handy reference for interpreting existing work and results.

---