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Nota di contenuto	Cover; Tittle Page; Copyright Page; Contents; Preface; List of Contributors; 1 The History and Future Trends of Non-halogenated Flame Retarded Polymers; 1.1 Introduction; 1.1.1 Why Non-Halogenated Flame Retardants?; 1.2 Key Flame Retardancy Safety Requirements; 1.3 Geographical Trends; 1.4 Applications for Non-halogenated FRP's; References; 2 Phosphorus-based FRs; 2.1 Introduction; 2.2 Main Classes of Phosphorus-based FRs; 2.3 Polyolefins; 2.4 Polycarbonate and Its Blends; 2.5 Polyphenylene Ether Blends; 2.6 Polyesters and Polyamides 2.7 Thermoplastic Elastomers (TPE) and Thermoplastic Polyurethanes (TPU)2.8 Epoxy Resins; 2.9 Unsaturated Polyesters; 2.10 PU Foams; 2.11 Textiles; 2.12 Conclusions and Further Trends; References; 3 Mineral Filler Flame Retardants; 3.1 Introduction; 3.2 Industrial Importance of Mineral Flame Retardants; 3.2.1 Market Share of Mineral FRs; 3.2.2 Synthetic Mineral FRs Within the Industrial Chemical Process Chain; 3.2.3 Natural Mineral FRs; 3.3 Overview of Mineral Filler FRs; 3.3.1 Mineral Filler Flame Retardants by Chemistry; 3.3.2 Classification by Production Process

3.3.2.1 Crushing and Grinding; 3.3.2.2 Air Classification; 3.3.2.3 Precipitation and Their Synthetic Processes; 3.3.2.4 Surface Treatment; 3.3.3 Physical Characterisation of Mineral FRs; 3.3.3.1 Particle Shape/Morphology/ Aspect Ratio; 3.3.3.2 Particle Size Distribution; 3.3.3.3 Sieve Residue; 3.3.3.4 BET Surface Area; 3.3.3.5 Oil Absorption; 3.3.3.6 pH-value/Specific Conductivity; 3.3.3.7 Bulk Density and Powder Flowability; 3.3.3.8 Thermal Stability/Loss on Ignition/Endothermic Heat; 3.3.4 General Impact of Mineral FRs on Polymer Material Properties; 3.3.4.1 Optical Properties; 3.3.4.2 Mechanical Properties; 3.3.4.3 Water Uptake and Chemical Resistance; 3.3.4.4 Thermal Properties; 3.3.4.5 Electrical Properties; 3.3.4.6 Rheological Properties; 3.4 Working Principle of Hydrated Mineral Flame Retardants; 3.4.1 Filler Loading, Flammability and Flame Propagation; 3.4.2 Smoke Suppression; 3.4.3 Heat Release; 3.5 Thermoplastic and Elastomeric Applications; 3.5.1 Compounding Technology; 3.5.2 Compound Formulation Principles; 3.5.3 Wire & Cable; 3.5.4 Other Construction Products; 3.5.5 Special Applications; 3.5.6 Engineering Plastics for E&E Applications; 3.6 Reactive Resins/Thermoset Applications; 3.6.1 Production Processes for Glass Fibre Reinforced Polymer Composite; 3.6.1.1 Paste Production; 3.6.1.2 Hand Lamination/Hand-lay-up; 3.6.1.3 SMC and BMC; 3.6.1.4 Pultrusion; 3.6.1.5 RTM/RIM; 3.6.2 Formulation Principles; 3.6.3 Public Transport Applications of GFRP; 3.6.4 E & E Applications; 3.6.5 Construction and Industrial Applications; 3.7 Summary, Trends and Challenges; References; 4 Nitrogen-based Flame Retardants; 4.1 Introduction; 4.2 Main Types of Nitrogen-based Flame Retardants; 4.3 Ammonia-based Flame Retardants; 4.3.1 Ammonium Polyphosphate

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## Sommario/riassunto

Due to the emphasis on replacing halogenated flame retardants with alternate technologies, this handbook contains in one place all of the current commercial non-halogenated flame retardant technologies, as well as experimental systems near commercialization. This book focuses on non-halogenated flame retardants in a holistic but practical manner. It starts with an overview of the regulations and customer perceptions driving non-halogenated flame retardant selection over older halogenated technologies. It then moves into separate chapters covering the known major classes of non-halo

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