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Nota di contenuto	Environmental and Human Health Impacts of Nanotechnology; Contents; Preface; Biographies; Contributors; 1: Overview of Nanoscience in the Environment; 1.1 Introduction; 1.2 History; 1.3 Definitions; 1.4 Investment and International Efforts; 1.5 Development: Four Anticipated Generations; 1.6 Applications of Nanotechnology; 1.7 Potential Benefits of Nanotechnology; 1.7.1 Environmental; 1.7.2 Human Health; 1.8 Potential Adverse Effects of Nanomaterials; 1.8.1 Environmental; 1.8.2 Human Health; 1.9 Classification; 1.9.1 Chemistry; 1.9.2 Origin; 1.9.3 Size; 1.9.4 State 1.10 Sources of Nanomaterials in the Environment1.11 Properties of Nanomaterials; 1.12 Nanomaterial Structure-Toxicity Relationship; 1.13 Environmental Fate and Behaviour of Nanomaterials; 1.13.1 Fate in Air;

1.13.2 Fate in Water; 1.13.3 Fate in Soil; 1.14 Potential for Human Exposure; 1.15 Detection and Characterization of Nanomaterials; 1.16 Issues to be Addressed; 1.16.1 Nomenclature; 1.16.2 Future Development and Risk; 1.16.3 Dosimetry; 1.16.4 Methods of Detection and Characterization; 1.16.5 Environmental Fate of Nanomaterials and their (Eco)Toxicology; 1.17 Conclusion; 1.18 References
2: Nanomaterials: Properties, Preparation and Applications2.1 Overview; 2.2 Introduction; 2.3 Nanoparticle Architecture; 2.3.1 Nanoparticle Surface; 2.3.2 Charge Stabilisation; 2.3.3 Steric Stabilisation; 2.4 Particle Properties; 2.4.1 Surface Plasmon Resonance; 2.4.2 Catalysis; 2.4.3 Quantum Confinement; 2.4.4 Mechanical Performance; 2.4.5 Magnetic Properties; 2.4.6 Interfacial Properties; 2.4.7 Other Properties; 2.5 Nanoparticle Preparation; 2.5.1 The Challenges of Nanoparticle Synthesis: Scale Up; 2.5.2 Reactivity; 2.5.3 Dispersability; 2.5.4 Cost; 2.5.5 Methods: Natural Sources
2.5.6 Top Down2.5.7 Bottom Up; 2.5.8 Metal Nanoparticles; 2.5.9 Carbon; 2.5.10 Graphene; 2.5.11 Carbon Black; 2.5.12 Inorganic Compounds; 2.5.13 Polymers; 2.6 Applications of Nanoparticles and Nanotechnology; 2.6.1 The Past; 2.6.2 The Present and Near Future; 2.7 Implication for Environmental Issues; 2.8 Conclusions; 2.9 References;
3: Size/Shape-Property Relationships of Non-Carbonaceous Inorganic Nanoparticles and their Environmental Implications; 3.1 Introduction; 3.2 Inorganic Nanoparticle Anatomy; 3.3 Redox Chemistry of Nanoparticles
3.3.1 Photoredox Chemistry in Semiconductor Nanoparticles3.3.2 Redox Chemistry in Other Nanoparticle Systems; 3.4 Size Effects in Nanoparticle Sorption Processes; 3.5 Nanoparticle Fate: Dissolution and Solid State Cation Movement; 3.5.1 Basic Energetic and Kinetic Considerations of Nanoparticle Dissolution; 3.5.2 Effects of Nanoparticle Morphology; 3.5.3 Effects of Nanoparticle Coatings and External Substances; 3.5.4 Case Study: The Dissolution of Lead Sulfide Nanoparticles; 3.5.5 Solid State Cation Movement in Nanoparticles
3.6 Effect of Nanoparticle Aggregation on Physical and Chemical Properties

Sommario/riassunto

An increased understanding of the environmental and human health impacts of engineered nanoparticles is essential for the responsible development of nanotechnology and appropriate evidence-based policy and guidelines for risk assessment. Presenting the latest advances in the field from a variety of scientific disciplines, this book offers a comprehensive overview of this challenging, inter-disciplinary research area. Topics covered include:The properties, preparation and applications of nanomaterialsCharacterization and analysis of manufactured nanoparticlesThe fate and behav