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Nota di contenuto	Cover; Title Page; Copyright; Contents; List of Contributors; Preface; Abbreviations; Chapter 1 Characterization of Nanomaterials in Nanotoxicological Analyses; 1.1 Introduction; 1.2 Size and Morphology of NMs; 1.2.1 Transmission Electron Microscopy (TEM); 1.2.2 Scanning Electron Microscopy (SEM); 1.2.3 Scanning Tunneling Microscopy (STM); 1.2.4 Atomic Force Microscopy (AFM); 1.2.5 Dynamic Light Scattering (DLS); 1.2.6 X-ray Diffraction (XRD); 1.2.7 Small-Angle X-ray Scattering (SAXS); 1.2.8 Brunauer-Emmett-Teller (BET); 1.2.9 Raman Scattering (RS); 1.3 Composition and Structure 1.3.1 Absorption and Emission Spectroscopy 1.3.2 Mass Spectrometry (MS); 1.3.3 X-ray Fluorescence Spectrometry (XRF); 1.3.4 Nuclear Magnetic Resonance (NMR); 1.3.5 X-ray Absorption Spectroscopy (XAS); 1.4 Surface Properties; 1.4.1 Surface Area; 1.4.2 Surface Charge; 1.4.3 Surface Composition; 1.4.4 Surface Reactivity; 1.5 Interactions between NMs and Biological Environments; 1.6 Conclusions; References; Chapter 2 Quantitative Analysis of Metal-Based Nanomaterials in Biological Samples Using ICP-MS; 2.1 Introduction; 2.2 ICP-MS: A Power Tool for Element Analysis; 2.2.1 Unique Features of ICP-MS 2.2.2 ICP-MS Hyphenated to Separation Techniques 2.3 Single-Particle ICP-MS: Theory and Application; 2.3.1 Basic Theory of SP-ICP-MS; 2.3.2

Applications of SP-ICP-MS; 2.4 Analysis of Nanoparticles by ICP-MS Hyphenate Techniques; 2.4.1 Solution-Based ICP-MS Hyphenated Techniques; 2.4.1.1 Field Flow Fractionation; 2.4.1.2 Hydrodynamic Chromatography; 2.4.1.3 Electrophoresis; 2.4.1.4 Laser Ablation ICP-MS for ENM Analysis; 2.5 Conclusion and Outlook; References; Chapter 3 Stable Isotopic Tracing of Nanomaterials In Vivo; 3.1 Introduction; 3.2 Development of Stable Isotope Labeling in Nanotechnology; 3.3 ¹³C-Labeled Carbon Nanomaterials; 3.3.1 Structure and Formation Mechanisms for Fullerene; 3.3.2 Trace and Quantification In Vivo for Fullerene; 3.3.3 Quantification and Distribution of ¹³C-CNT and Carbon Particles; 3.3.4 Isotope Effects and Imaging of ¹³C-CNT; 3.3.5 Structure and Formation of ¹³C-Enriched Graphene Nanomaterials; 3.4 Metal Stable Isotope Labeled Nanoparticles; 3.4.1 Trace and Quantification of ZnO Nanoparticles in Nanotoxicology and Ecotoxicology; 3.4.2 Trace and Quantification of CuO Nanoparticles in Nanotoxicology and Ecotoxicology; 3.4.3 Other Stable Isotopes for Tracing and Quantifying Nanomaterials In Vivo; 3.4.4 Other Stable Isotopes for the Structure and Reaction of Nanomaterials; 3.5 Summary and Outlook; References; Chapter 4 Radiolabeling of Nanoparticles; 4.1 Introduction; 4.1.1 Radioisotope Production; 4.1.2 Radiolabeling Methods of Nanoparticles; 4.1.2.1 Synthesis of Nanoparticles from Radioactive Precursors; 4.1.2.2 Neutron or Ion-Beam Activation; 4.1.2.3 Isotopic Exchange and Cation Exchange; 4.1.2.4 Physical Absorption; 4.1.2.5 Covalent Attachment
