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Nota di contenuto	1. Advanced Microscopy Techniques for Nanoscale Diagnostic of Cultural Heritage: Scanning Electron Microscopy for Investigation of Medieval Coins and Frescos from the Republic of Tatarstan; 1.1 Introduction 1.2 Optical Microscopy and Confocal Optical Microscopy1. 3 Raman Microscopy; 1.4 Fourier Transform Infrared Microscopy; 1.5 Electron Microscopy; 1.5.1 Transmission Electron Microscopy; 1.5.2 Scanning Electron Microscopy; 1.6 Atomic Force Microscopy; 1.7 Correlative Optical and Scanning Electron Microscopy: A Case Study; 1.7.1 SEM\EDS Characterization of Islamic Coins Found in Excavation Sites of Volga Bulgary (Republic of Tatarstan); 1.7.2 SEM\EDS Characterization of Fresco Base From the Assumption Cathedral of Sviyazhsk (Republic of Tatarstan); 1.8 Conclusions -- 2. X-Ray Computed Microtomography for Paleoanthropology, Archaeology, and Cultural Heritage; 2.1 Introduction; 2.2 Conventional and Synchrotron MicroCT; 2.2.1 Phase-Contrast Imaging; 2.2.2 Local Area MicroCT; 2.3 Application to Paleoanthropology; 2.3.1 Virtual Restoration; 2.3.2 Virtual Endocast and Brain Morphology; 2.3.3 Biomechanical Analysis; 2.3.4 Neanderthal Patellae; 2.3.5 Tooth Microstructures; 2.4 Application to Archaeology; 2.4.1 Pottery; 2.4.2 Clay Plaster; 2.4.3 Projectile Impact Marks; 2.4.4 Archaeozoology; 2.4.5 Virtual

Unwrapping and Reading of Deteriorated Scrolls; 2.5 Application to Cultural Heritage; 2.5.1 Stained Glass Windows; 2.5.2 Bowed Stringed Instruments; 2.6 Conclusions -- 3. Neutron Imaging -- 4. Neutron Diffraction and (n, Y)-Based Techniques for Cultural Heritage; 4.1 Introduction; 4.2 Case Studies; 4.2.1 The "Gates of Paradise": Ghiberti Bronze Gilded Reliefs; 4.2.2 Weapons: The Japanese Swords; 4.2.3 Ancient Musical Instruments: New Insights; 4.3 Outlook -- 5. Calorimetric and Thermoanalytical Techniques in the Study of Ageing Phenomena and Molecular Interaction in Paintings; 5.1 Introduction; 5.2 Thermogravimetry and Differential Scanning Calorimetry; 5.2.1 Thermogravimetry and Gas Analysis; 5.3 Binders and Pigments; 5.3.1 Oil Binders; 5.3.2 Acrylic Binders; 5.3.3 Tempera Binders; 5.4 Pigments; 5.5 Conclusions -- 6. Tree-Ring Analysis on Wooden Artifacts: What Can It Tell Us?; 6.1 Introduction; 6.1 General Principles and Methods; 6.3 Applications of Dendrochronological Dating; 6.4 Requirements for Tree-Ring Dating; 6.5 Dendrochronological Sampling; 6.6 Statistical Tests; 6.7 What Kind of Dating?; 6.8 Dendroprovenance; 6.9 Conclusion -- 7. Raman Spectroscopy for the Material Analysis of Medieval Manuscripts; 7.1 Applications of Raman Spectroscopy in Cultural Heritage; 7.2 Raman Spectrometers; 7.3 Description of the Applied Instrument; 7.4 Raman Spectroscopy of the Main Materials Used for Medieval Manuscripts: Background Informationp; 7.4.1 Parchment as Writing Substrate; 7.4.2 Inks and Pigments; 7.5 Results; 7.5.1 Analysis of Parchment; 7.5.2 Black/Brown and Red Inks; 7.5.3 Blue Inks and Blue/Green Pigments; 7.5.4 Brown Pigments; 7.6 Conclusions -- 8. Nanoclays for Conservation -- 9. Smart Soft Nanomaterials for Cleaning -- 10. Ancient and Modern Binders: Naturally nanostructure Materials -- 11. Plasma Surface Cleaning of Cultural Heritage Objects -- 12. The Conservation of Contemporary Paintings: From Dry Cleaning to Microemulsions -- 13. Investigation of Herculaneum Papyri by X-Ray Phase-Contrast Tomography -- 14. Nanotechnologies and Nanomaterials: An Overview for Cultural Heritage

Sommario/riassunto

'Nanotechnologies and Nanomaterials for Diagnostic, Conservation and Restoration of Cultural Heritage' explores how advanced nanoscale techniques can help preserve artworks. The book covers lab-scale available techniques as well as advanced methods from neutron sources and X-ray spectroscopy. Other sections highlight a variety of nanomaterials with potential uses in treatments for restoration and conservation, with conservation, consolidation and long-term protection protocols analyzed in each case. The final chapter presents case studies, demonstrates how nanoscale techniques are used to conserve art, and shows what happens when misinterpretation of data sources leads to misdiagnosis. The book is intended for scientists from academic and professional conservators, restorers who are involved in the conservation of artistic and historical artifacts, and those who want to learn how nanotechnology can increase the efficiency of conservation and protection techniques.--