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Soggetti	Spectrum analysis Surfaces (Physics) Condensed matter Materials - Analysis Biophysics Spectroscopy Surface and Interface and Thin Film Condensed Matter Physics Characterization and Analytical Technique Bioanalysis and Bioimaging
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Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	1 The Transmission Electron Microscope -- 2 Scattering and Diffraction -- 3 Elastic Scattering -- 4 Inelastic Scattering and Beam Damage -- 5 Electron Sources -- 6 Lenses, Apertures, and Resolution -- 7 How to “See” Electrons -- 8 Pumps and Holders -- 9 The Instrument -- 10 Specimen Preparation -- 11 Diffraction Patterns -- 12 Thinking in Reciprocal Space -- 13 Diffracted Beams -- 14 Bloch Waves -- 15 Dispersion Surfaces -- 16 Diffraction from Crystals -- 17 Diffraction from Small Volumes -- 18 Indexing Diffraction Patterns -- 19 Kikuchi Diffraction -- 20 Obtaining CBED Patterns -- 21 Using Convergent-Beam Techniques -- 22 Imaging in the TEM -- 23 Thickness and Bending Effects -- 24 Planar Defects -- 25 Strain Fields -- 26 Weak-Beam Dark-Field Microscopy -- 27 Phase-Contrast Images -- 28 High-

Resolution TEM -- 29 Image Simulation -- 30 Quantifying and Processing HRTEM Images -- 31 Other Imaging Techniques -- 32 X-ray Spectrometry -- 33 The XEDS-TEM Interface -- 34 Qualitative X-ray Analysis -- 35 Quantitative X-ray Microanalysis -- 36 Spatial Resolution and Minimum Detectability -- 37 Electron Energy-Loss Spectrometers -- 38 The Energy-Loss Spectrum -- 39 Microanalysis with Ionization-Loss Electrons -- 40 Everything Else in the Spectrum -- Acknowledgements for Figures.

Sommario/riassunto

Electron microscopy has revolutionized our understanding the extraordinary intellectual demands required of the mi- of materials by completing the processing-structure-prop- croscopist in order to do the job properly: crystallography, erties links down to atomistic levels. It now is even possible diffraction, image contrast, inelastic scattering events, and to tailor the microstructure (and meso structure) of materials spectroscopy. Remember, these used to be fields in them- to achieve specific sets of properties; the extraordinary abili- selves. Today, one has to understand the fundamentals ties of modem transmission electron microscopy-TEM- of all of these areas before one can hope to tackle signifi- instruments to provide almost all of the structural, phase, cant problems in materials science. TEM is a technique of and crystallographic data allow us to accomplish this feat. characterizing materials down to the atomic limits. It must Therefore, it is obvious that any curriculum in modem mate- be used with care and attention, in many cases involving rials education must include suitable courses in electron mi- teams of experts from different venues. The fundamentals croscopy. It is also essential that suitable texts be available are, of course, based in physics, so aspiring materials sci- for the preparation of the students and researchers who must entists would be well advised to have prior exposure to, for carry out electron microscopy properly and quantitatively.