



# Aberration-corrected Analytical Electron Microscopy

Wiley,  
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Electronic resource

Electronic books

Monografía

The book is concerned with the theory, background, and practical use of transmission electron microscopes with lens correctors that can correct the effects of spherical aberration. The book also covers a comparison with aberration correction in the TEM and applications of analytical aberration corrected STEM in materials science and biology. This book is essential for microscopists involved in nanoscale and materials microanalysis especially those using scanning transmission electron microscopy, and related analytical techniques such as electron diffraction x-ray spectrometry (EDXS) and electron energy loss spectroscopy (EELS)

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**Título:** Aberration-corrected Analytical Electron Microscopy

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**Contenido:** ""Aberration-Corrected Analytical Transmission Electron Microscopy""; ""Contents""; ""List of Contributors""; ""Preface""; ""1 General Introduction to Transmission Electron Microscopy (TEM)""; ""1.1 What TEM Offers""; ""1.2 Electron Scattering""; ""1.2.1 Elastic Scattering""; ""1.2.2 Inelastic Scattering""; ""1.3 Signals which could be Collected""; ""1.4 Image Computing""; ""1.4.1 Image Processing""; ""1.4.2 Image Simulation""; ""1.5 Requirements of a Specimen""; ""1.6 STEM Versus CTEM""; ""1.7 Two Dimensional and Three Dimensional Information""; ""2 Introduction to Electron Optics"" ""2.1 Revision of Microscopy with Visible Light and Electrons"" ""2.2 Fresnel and Fraunhofer Diffraction""; ""2.3 Image Resolution""; ""2.4 Electron Lenses""; ""2.4.1 Electron Trajectories""; ""2.4.2 Aberrations""; ""2.5 Electron Sources""; ""2.6 Probe Forming Optics and Apertures""; ""2.7 SEM, TEM and STEM""; ""3 Development of STEM""; ""3.1 Introduction: Structural and Analytical Information in Electron Microscopy""; ""3.2 The Crewe Revolution: How STEM Solves the Information Problem""; ""3.3 Electron Optical Simplicity of STEM""; ""3.4 The Signal Freedom of STEM"" ""3.4.1 Bright-Field Detector (Phase Contrast, Diffraction Contrast)"" ""3.4.2 ADF, HAADF""; ""3.4.3 Nanodiffraction""; ""3.4.4 EELS""; ""3.4.5 EDX""; ""3.4.6 Other Techniques""; ""3.5 Beam Damage and Beam Writing""; ""3.6 Correction of Spherical Aberration""; ""3.7 What does the Future Hold?""; ""4 Lens Aberrations: Diagnosis and Correction""; ""4.1 Introduction""; ""4.2 Geometric Lens Aberrations and Their Classification""; ""4.3 Spherical Aberration-Correctors""; ""4.3.1 Quadrupole-Octupole Corrector""; ""4.3.2 Hexapole Corrector"";

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