

C. Barry Carter · David B. Williams *Editors*

Transmission Electron Microscopy

The Companion Volume, Second Edition

This volume is the second edition of *Transmission Electron Microscopy: Diffraction, Imaging, and Spectrometry* building upon the foundation of the first edition while significantly expanding and updating its scope. The book remains true to its mission of being a student-focused textbook, designed to complement the bestselling *Transmission Electron Microscopy: A Textbook for Materials Science*, by Williams and Carter.

As a comprehensive guide to advanced topics in TEM (Transmission Electron Microscopy), this companion covers the latest technological advancements, new applications, and enduring techniques essential to the field. The chapters explore rapidly evolving areas like in-situ experiments, electron diffraction, STEM, energy-filtered TEM (EFTEM) imaging, holography, and tomography. It also emphasizes both theoretical and practical aspects of TEM, with expert insights from world-renowned researchers.

Since the first edition of this book, the field of TEM has advanced significantly, particularly in the realms of computer-controlled instrumentation and data acquisition. This edition reflects the maturation of techniques like cryogenic electron microscopy, holography, and ptychography, all of which are now more accessible due to software-driven innovations.

As in the first edition, this volume includes two sets of questions at the end of each chapter: one for self-assessment and another suitable for homework assignments. The text encourages a thoughtful, interactive learning process, prompting students to engage deeply with the material and further explore scientific literature and resources.

Richly illustrated with high-quality color figures, this new edition offers unparalleled visual representations of the complex phenomena under study. It provides clarity on key challenges and pitfalls in modern TEM techniques, making it an essential resource for both novice and experienced microscopists.

In keeping with its role as a textbook, this companion remains an important resource for graduate students and professionals in materials science, offering detailed discussion and practical guidance on a wide array of TEM technologies and methodologies.

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