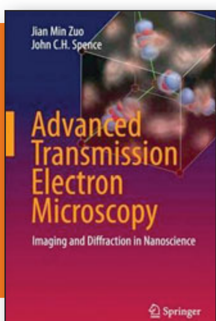
Readers should pay special attention to Part III. Every material releases pollution as a result of its interaction with environment conditions (indoor or outdoor). This must be taken into account during the lifetime of every material, because the pollution affects human health. As expressed in the book: "What is the point in saving energy and protecting the natural habitat if the same choice damages the health of the building's users?" This section makes an important and novel contribution due to its proposal of a new approach to this problem by evaluating the pattern in existing recognition of issues associated with the toxicity of building materials, such as lead and asbestos. A table lists the substances that are regulated in the building industry (e.g., formaldehyde, phthalate plasticizers in polyvinyl chloride) and their possible effects on human health. Another table presents a comparison between regulated levels of volatile organic compounds in carpets and the classification of the same chemicals for impact on human health.

Part IV reviews case studies. Notable examples include traditional building in Serbia, palm-thatched building in Mexico, and the New Zealand House. These case studies are useful to compare and develop similar projects regarding sustainable building.

References are complete and appropriate for each section. A specific technical background is not necessary to understand the content. This book focuses on the ontological considerations of building materials and is relevant for all those interested in sustainable building, including professionals in the construction industry.

***Reviewer: Miriam Sánchez Pozos** of the Department of Mechanical Engineering and Sustainable Energy Engineering, Universidad Autónoma del Estado de México, Mexico.*



Advanced Transmission Electron Microscopy: Imaging and Diffraction in Nanoscience

Jian Min Zuo and John C.H. Spence

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Transmission electron microscopy (TEM) and associated techniques are essential tools for materials science students and professionals. Modern TEM has become more capable and reveals a lot of information. However, the interpretation demands knowledge of the interaction between electrons and materials, which is the focus of this book. This book was developed based on the authors' previous classic book, *Electron Microdiffraction* (Plenum, New York, 1992), with some extension to reflect recent progress in TEM.

The book starts with a brief introduction to the fundamentals of matter–electron interactions and historical development of TEM and electron diffraction, particularly microbeam diffraction. Chapter 2 explains the electron wave and its propagation and lays the theoretical foundation for the following chapters. Chapter 3 elucidates diffraction geometry of crystalline materials. The more theoretical aspects of electron diffraction and the kinematical and dynamic theories are introduced in chapters 4 and 5. Chapters 6–9 describe the electron optics and the instrument, including lens design (chapter 6), lens aberration and correction (chapter 7), and electron sources and detectors (chapters 8 and 9). Chapter 10 covers the experimental techniques, but these techniques are still more theoretical, so this chapter is by no means an operations manual. However, it is rewarding to understand the fundamental principles behind each step of alignment. Crystallography is covered in chapters 11 and 12; chapter 11 includes symmetry of crystals, while crystal structures and their atomic bonding are elucidated in chapter 12. The impact of temperature and the imperfection of crystals on diffraction, as well as diffuse scattering, is discussed in chapter 13. Chapter 14 explains atomic resolution imaging, both high-resolution TEM and scanning transmission electron microscopy.

Although most of the first 14 chapters lay a solid foundation for electron microscopy and the interaction between electrons and matter, chapters 15–17 are more practical and vital for researchers working on microstructure characterization of materials. These chapters explain the theory and experimental techniques in defect analysis (chapter 15), strain measurement (chapter 16), and nanomaterials study (chapter 17). They are also good references for researchers in these fields, as very recent progress is also reviewed. The appendices are useful for data analysis.

This book is more about imaging and diffraction; although the knowledge covered makes it easier to understand energy-dispersive spectroscopy and electron energy-loss spectroscopy, these topics are not included. In comparison with other books on TEM, this one is written at a more advanced level and is targeted at materials science or physics graduate students. The content leans more on the theoretical than the experimental aspects of TEM. This book would be a good choice for students or researchers who have some knowledge and experience and are seeking a better understanding of TEM or are planning in-depth microstructural analysis work. However, as a textbook, there is a lack of worked examples and homework problems. All figures and tables are helpful for the readers to understand the associated topics. The book is largely self-contained, but previous exposure to quantum mechanics and related mathematics is highly desired.

***Reviewer: Wanfeng Li**, research engineer of Research & Advanced Engineering, Ford Motor Company, USA.*

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