

**W**hile X-ray diffraction investigation of powders and polycrystalline matter was at the forefront of materials science in the 1960s and 70s, high-tech applications at the beginning of the 21st century are driven by the materials science of thin films. Very much an interdisciplinary field, chemists, materials scientists, physicists and engineers all have a common interest in thin films and their manifold uses and applications.

Crystallite size, porosity, density, preferred orientation and other properties are important to know: whether thin films fulfill their intended function depends crucially on their structure and morphology once a chemical composition has been chosen. Although their backgrounds differ greatly, all the involved specialists have a profound understanding of how structural properties may be determined in order to perform their respective tasks in search of new and modern materials, coatings and functions. The author undertakes this in-depth introduction to the field of thin film X-ray characterization in a clear and precise manner.

#### **From the Contents**

- Principles of X-Ray Diffraction
- Identification of Chemical Phases
- Line Profile Analysis
- Grazing Incidence Configurations
- Texture and Preferred Orientations
- Residual Stress Analysis
- High Resolution X-ray Diffraction

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*The author is or has been involved in the development of thin film systems for applications in sensor technology, photovoltaics and as protective coatings. His main scientific interest is focused on the structure and morphology of thin films, their investigation by x-ray scattering techniques and the relationship between structure and function.*

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