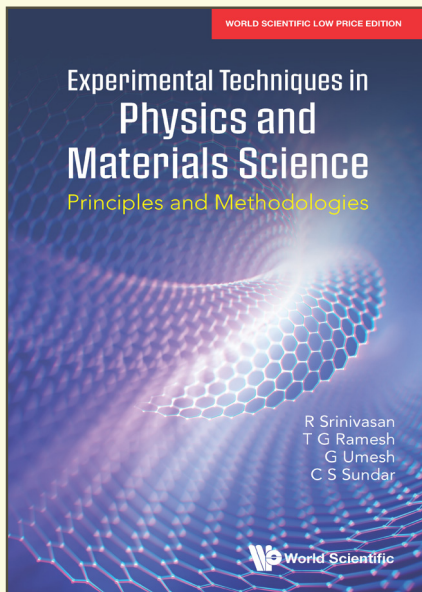


Experimental Techniques in Physics and Materials Science

Principles and Methodologies



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ABOUT THE BOOK

There have been new developments in experimental techniques for preparing and characterizing materials and for measuring their properties. These techniques are not being taught to students at the master's or even doctoral levels because there is no single book which deals with all these techniques at a basic level. The present book is an attempt to overcome this problem.

The book is divided into five sections: (1) Techniques for preparing materials in the bulk, nanoscale and thin film forms; (2) Techniques for characterizing materials like X ray and neutron powder diffraction, ESCA, Ellipsometry for thin films, Ultrasonic techniques, Electron microscopy, Surface probe techniques and Positron annihilation for defect studies; (3) Techniques for measurements, at research level, of the elastic, thermal, electrical, dielectric and magnetic properties; (4) Spectroscopic techniques such as NMR-EPR spectroscopy, IR, Visible-UV spectroscopy and Mossbauer spectroscopy and (5) Phase transitions. In each of the above topics the basic principles are clearly laid out, the experimental set-ups are described, and typical examples are cited to illustrate the physics revealed by these techniques.

The book can be used for a two-semester course on experimental techniques in physics and materials science at the master's and pre-doctoral degree levels for students.

READERSHIP

Academic researchers and graduates in physics and materials science.

CONTENTS

- **Techniques for Preparation of Materials:**
 - Techniques for Preparation of Solid-State Materials and Nanoparticles
 - Deposition of Thin Films
- **Techniques for Materials Characterization:**
 - X-Ray and Neutron Powder Diffraction
 - Electron Spectroscopy for Chemical Analysis

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 - Thermal Expansion of Solids
 - Thermal Conductivity and Diffusivity
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 - Phase Transitions

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