



Chemical Sensing with Solid State Devices

Marc J. Madou, S. Roy Morrison

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This book is a lucid presentation for chemists, electrical engineers, surface scientists, and solid-state physicists, of the fundamentals underlying the construction of simple and small chemical sensors.

The first part of the book is a review of the theoretical background in solid state physics, chemistry and electronics. Semiconductor and solid electrolyte bulk models are reviewed as well as solid/gas and solid/liquid interface models. Membranes and catalysis theory are also covered expansively. The second part is a discussion of more complete sensor devices, their essential components, and of the important developments in this area over the last fifteen to twenty years.

The book provides guidance through the multidisciplinary world of chemical sensors. It should be understandable to students with some training in physics and chemistry and a general knowledge of electronics. Finally, comments on economic considerations in the development of new sensor products and suggestions for future research and development should be of value to company R&D planners.

Key Features

- * Introduction
- * Solid State Background
- * Solid/Gas Interfaces
- * Solid/Liquid Interfaces
- * Catalysis Background
- * Membrane Background
- * Biosensor Principles
- * Principles of Chemfet Operation
- * Silicon Based Chemical Sensors
- * Thin Film Gas Sensors
- * Solid Electrolytes-Devices
- * Gas Sensors Based on Semiconductor Powders
- * Application of Solid State Chemical Sensors

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