

Chemical Sensors: Properties, Performance and Applications

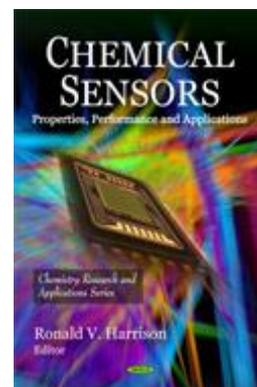
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Book Description:

Ozone is a harmful gas to people's health even at low concentrations. Thus, it has attracted much interest to develop portable energy-saving high-resolution ozone sensors. In this book, the physical principle of photon stimulated ozone sensors based on indium oxide nanostructures has been investigated. Ozone sensors have been integrated with light-emitting diodes (LEDs) and the sensor performance towards real applications has been tested. To examine the mechanisms of photon stimulation (photoreduction) and oxidation effects, electrical, surface analytical and structural characterization of ozone sensing layers were performed and analyzed. Moreover, optical fiber sensor has found applications in the biomedical research, industrial process control and environmental monitoring. This book provides a review of the optical fiber sensor, especially focused on the optical fiber sensor development and its application in gas detection. In addition, electrochemical impedance spectroscopy (EIS) is a sensitive tool providing information on various physical and chemical properties of materials, as well as on interaction processes occurring in the bulk or at the surface of these materials. In this book, the use of impedimetric transducers based on interdigitated electrode arrays (IDEA) for chemical and bio-sensors development is reviewed. Different designs of IDEA devices are presented and the effect of the transducer geometry on resulting impedance spectra is discussed. The authors also examine the development of an amperometric biosensor for phenol detection. The variables that exert influence on the performance of the biosensor response, including enzyme immobilization procedure, laccase amounts, pH and working potential were investigated as well. Furthermore, the feasibility of the biosensor response for various phenol compounds was also investigated. Recent advances in sensor technology, signal processing and pattern recognition algorithms have led to the development of chemical sensing instruments housing one or more non-specific gas sensors. This book also reviews the recent applications of non-specific gas sensor array technologies used for environmental monitoring of odours; including a brief history on odour measurement applications; the different types of sensors utilised in gas sensor array systems and a range of pattern recognition techniques, from simple statistical analyses to artificial neural networks, used for the purpose of odour identification and quantification is also discussed.



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