

ISBN: 158053340X

Book's cover

Book Description

All about **SENSORS**

Ranging from basic principles to advanced concepts and real-world applications, this comprehensive reference offers you expert guidance in radiation dosimetry. The book thoroughly examines the physics of radiation, its biological effects, commercial products, device design, and measurement methods. You find critical details on sensing using thin/thick film technology and discover the latest about gamma radiation dosimetry using metal oxides and polymers, including metal substituted phthalocyanines.

You gain deep knowledge of the effects of radiation on physical processes, helping you to design more cost-effective dosimeter devices. The book presents in-depth information on commercially available dosimetry equipment, offering you a solid understanding of how these products operate and how to use them in mining, construction, medical, energy, defense, and security applications. In addition, this cutting-edge volume presents the radiation dose concept, where accuracy of dose measurement and classification between different radiation types, e.g. alpha, beta, gamma etc, is enhanced by applying specific pattern recognition algorithm.

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Contents:

Introduction.

Radiation Dosimetry: Background and Principles—Review of the Radiation Types. Biological Effects of Radiation. Basic Principles of Radiation Protection. Dosimetry for Industrial Radiation Processing. Medical Use of Ionizing Radiation. Uncontrolled Radioactive Releases. Review of the Principles and Materials in Radiation Dosimetry.

Effects of Radiation on Optical and Electrical Properties of Materials—Introduction. Optical Absorption. Amorphous Films. Absorption Spectra of Amorphous Solids. Metal-Semiconductor Contacts. Conduction Mechanisms in Amorphous Materials. Radiation Damage in Crystalline Structures. Radiation-Induced Defects in Oxide Materials. Radiation Effects in Polymers. Radiation-Induced Degradation Processes in Device Parameters.

Gamma Radiation Dosimetry Using Metal Oxides and Metal-Substituted Phthalocyanines—Thin and Thick Film Technologies. Thin Films as Radiation Sensors. Thick Films as Radiation Sensors. Conclusion.

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Conclusion and Future Trends.

Appendix. List of Acronyms. Index. Author's Biography.

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Advanced Materials and Techniques for Radiation Dosimetry -- Contents -- Preface xi -- 1 Introduction 1 -- References 8 -- 2 Radiation Dosimetry: Background and Principles 11 -- 2.1 Review of Radiation Types 11 -- 2.1.1 Ionizing Radiation 11 -- 2.1.2 Stopping Power and Linear Energy Transfer 14 -- 2.1.3 Radiation Units 24 -- 2.2 Biological Effects of Radiation 25 -- 2.2.1 Types. 2.6 Uncontrolled Radioactive Releases 39 -- 2.6.1 Nuclear Accidents 40 -- 2.6.2 Radioecology After Nuclear Accidents 41 -- 2.6.3 Further Examples of Nuclear Contamination 45 -- 2.7 Review of the Principles and Materials in Radiation Dosimetry 46 -- 2.7.1 Dosimetry 46 -- 2.7.2 Classification and Calibration of Dosimeters 48 -- 2.7.3 Gas-Filled Detectors 51 Fundamentals of Radiation Dosimetry and. Radiological Physics. Alex F Bielajew The University of Michigan Department of Nuclear Engineering and Radiological Sciences 2927 Cooley Building (North Campus) 2355 Bonisteel Boulevard Ann Arbor, Michigan 48109-2104. A formal course in dosimetry usually starts at Chapter 4, Macroscopic Radiation Physics, that describes macroscopic eld quantities (primarily uence). However, this is an approximation (a good one) for rudimentary dosimetry. Underpinning this, however, is the realiza-tion that these elds are made up of discrete particles. Finally, we consider the total cross section versus energy for the materials hydrogen, water and lead, shown in Figure 1.9. The total cross section is plotted in the units cm²/g. 2. Arshak, K. Korostynska, O. Advanced Materials and. Techniques for Radiation Dosimetry. Boston, Artech House, 2006. 3. Bunshah, R. F. Handbook of Deposition Technologies for. Films and Coatings “ Science, Technology and Applications. Park Ridge, Noyes, 1994. 4. Chapman, B. N. Glow Discharge Processes: Sputtering and. Join ResearchGate to discover and stay up-to-date with the latest research from leading experts in Radiation Dosimetry and many other scientific topics. Join for free. or. Discover by subject area. Join for free. Login. Email.

2. Arshak, K. Korostynska, O. *Advanced Materials and Techniques for Radiation Dosimetry*. Boston, Artech House, 2006. 3. Bunshah, R. F. *Handbook of Deposition Technologies for Films and Coatings* Science, Technology and Applications. Park Ridge, Noyes, 1994. 4. Chapman, B. N. *Glow Discharge Processes: Sputtering and*.
Join ResearchGate to discover and stay up-to-date with the latest research from leading experts in Radiation Dosimetry and many other scientific topics. Join for free. or. Discover by subject area. Recruit researchers. Join for free. Login. Radiation dosimetry and spectrometry with superheated emulsions. Nucl. Instr. \hat{A} Advanced Radiation Dosimetry System (ARDOS) A novel ? techniques Several that account and compensate Documents. Radio Biology, Dosimetry and Radiation Protection 1[2] Documents. A secondary standard dosimetry system for calibration of radiation protection instruments Documents. Review of retrospective dosimetry techniques for external ionising radiation exposures Documents. Dosimetry and techniques for simultaneous hyperthermia and external beam radiation therapy Documents. Nuclear Data in Radiation Protection Dosimetry Documents. Free radical dosimetry techniques and their suitability for precis (This article belongs to the Special Issue Techniques and Methods for Advanced Characterization of Luminescent Materials). $\hat{a}^{-9}\hat{a}^{-1/4}$ Figures. Figure 1. \hat{A} Thermally stimulated luminescence (TSL) is known as a technique used in radiation dosimetry and dating. However, since the luminescence is very sensitive to the defects in a solid, it can also be used in material research. In this review, it is shown how TSL can be used as a research tool to investigate luminescent characteristics and underlying luminescent mechanisms.

Radiation Protection Dosimetry is a monthly peer-reviewed scientific journal covering radiobiology, especially dosimetry and radiation monitoring for both ionizing and non-ionizing radiation. The editor-in-chief is J. Hans Zoetelief (Delft University of Technology). According to the Journal Citation Reports, the journal had a 2013 impact factor of 0.861. Fundamentals of Radiation Dosimetry and Radiological Physics. Alex F Bielajew The University of Michigan Department of Nuclear Engineering and Radiological Sciences 2927 Cooley Building (North Campus) 2355 Bonisteel Boulevard Ann Arbor, Michigan 48109-2104.Â This book arises out of a course I am teaching for a three-credit (42 hour) graduate-level course Dosimetry Fundamentals being taught at the Department of Nuclear Engineering and Radiological Sciences at the University of Michigan. It is far from complete. A formal course in dosimetry usually starts at Chapter 4, Macroscopic Radiation Physics, that describes macroscopic quantities (primarily uence). However, this is an approximation (a good one) for rudimentary dosimetry.