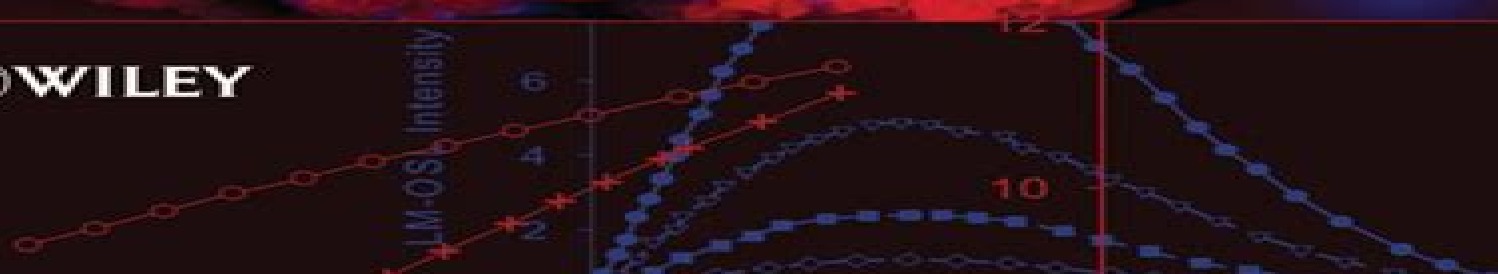


Thermally and Optically Stimulated **Luminescence**

A Simulation Approach

Reuven Chen and Vasilis Pagonis

 **WILEY**



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Thermally And Optically Stimulated Luminescence A Simulation Approach:

Thermally and Optically Stimulated Luminescence Reuven Chen, Vasilis Pagonis, 2011-04-08 Thermoluminescence TL and optically stimulated luminescence OSL are two of the most important techniques used in radiation dosimetry. They have extensive practical applications in the monitoring of personnel radiation exposure in medical dosimetry, environmental dosimetry, spacecraft nuclear reactors, food irradiation, etc. and in geological archaeological dating. Thermally and Optically Stimulated Luminescence: A Simulation Approach describes these phenomena, the relevant theoretical models, and their prediction using both approximations and numerical simulation. The authors concentrate on an alternative approach in which they simulate various experimental situations by numerically solving the relevant coupled differential equations for chosen sets of parameters. Opening with a historical overview and background theory, other chapters cover experimental measurements, dose dependence, dating procedures, trapping parameters, applications, radiophotoluminescence, and effects of ionization density. Designed for practitioners, researchers, and graduate students in the field of radiation dosimetry, Thermally and Optically Stimulated Luminescence provides an essential synthesis of the major developments in modeling and numerical simulations of thermally and optically stimulated processes.

Advances In Physics And Applications Of Optically And Thermally Stimulated Luminescence Reuven Chen, Vasilis Pagonis, 2019-03-06 In this volume, international leading experts in the study of thermally and optically stimulated luminescence give an up-to-date comprehensive coverage of the theoretical and experimental aspects of these subjects, as well as their applications. The theory of thermoluminescence TL and optically stimulated luminescence OSL are discussed in detail, including mainly solid state models of localized and delocalized transitions. These models cover the effects occurring during the excitation by irradiation and the read-out by heating or by exposure to light. The methods described consist of analytical mathematical considerations as well as numerical simulations. The main application of these effects, namely radiation dosimetry, includes personal and environmental dosimetry as well as retrospective dosimetry and the dosimetry of cosmic radiation and space missions. Also discussed in detail are archaeological and geological dating, the use of luminescence dosimetry in medical physics, as well as general applications in geosciences, other model subjects such as time-resolved luminescence and thermally assisted OSL, and the sister subject of

thermoluminescence in photosynthetic materials. *A Course in Luminescence Measurements and Analyses for Radiation Dosimetry* Stephen W. S. McKeever, 2022-05-16 A Course in Luminescence Measurements and Analyses for Radiation Dosimetry: A complete approach to the three key techniques in luminescence dosimetry. In A Course in Luminescence Measurements and Analyses for Radiation Dosimetry, expert researcher Stephen McKeever delivers a holistic and comprehensive exploration of the three main luminescence techniques used in radiation dosimetry: thermoluminescence, optically stimulated luminescence, and radiophotoluminescence. The author demonstrates how the three techniques are related to one another and how they compare to each other. Throughout, the author's focus is on pedagogy, including state-of-

the art research only where it is relevant to demonstrate a key principle or where it reveals a critical insight into physical mechanisms The primary purpose of the book is to teach beginning researchers about the three aforementioned techniques their similarities and distinctions and their applications A Course in Luminescence Measurements and Analyses for Radiation Dosimetry offers access to a companion website that includes original data sets and problems to be solved by the reader The book also includes A thorough introduction to the field of luminescence applications in radiation dosimetry including a history of the subject Comprehensive explorations of introductory models and kinetics including the concepts of thermoluminescence optically stimulated luminescence and radiophotoluminescence Practical discussions of luminescence curve shapes including the determination of trapping parameters from experimental thermoluminescence and optically stimulated luminescence data In depth examinations of dose response functions superlinearity supralinearity and sublinearity as well as the causes of non linearity Detailed examples with well known materials A Course in Luminescence Measurements and Analyses for Radiation Dosimetry is an invaluable guide for undergraduate and graduate students in the field of radiation dosimetry as well as faculty and professionals in the field *Luminescence Signal Analysis Using Python* Vasilis

Pagonis, 2022-03-31 This book compiles and presents a complete package of open access Python software code for luminescence signal analysis in the areas of radiation dosimetry luminescence dosimetry and luminescence dating Featuring more than 90 detailed worked examples of Python code fully integrated into the text 16 chapters summarize the theory and equations behind the subject matter while presenting the practical Python codes used to analyze experimental data and extract the various parameters that mathematically describe the luminescence signals Several examples are provided of how researchers can use and modify the available codes for different practical situations Types of luminescence signals analyzed in the book are thermoluminescence TL isothermal luminescence ITL optically stimulated luminescence OSL infrared stimulated luminescence IRSL timeresolved luminescence TR and dose response of dosimetric materials The open access Python codes are available at GitHub The book is well suited to the broader scientific audience using the tools of luminescence dosimetry physicists geologists archaeologists solid state physicists medical physicists and all scientists using luminescence dosimetry in their research The detailed code provided allows both students and researchers to be trained quickly and efficiently on the practical aspects of their work while also providing an overview of the theory behind the analytical equations Rare Earth Elements and Their Minerals Michael Aude, Takahito Nakajima, 2020-06-17 This book

describes the recent evolution of rare earth elements and their mineralogy both natural and synthetic analogues Authors review and document rare earth element chemistry in the aqueous environment and the petrology of the rare earth element bearing mineral Allanite Synthetic rare earth minerals and their applications is a rapidly evolving discipline important to medicine advanced digital technologies and solid state physics Authors report on the synthesis of a macrocyclic gadolinium complex and also gadolinium complexes and their applications in medicine Authors present compelling advances in

gadolinium isotopes and oxides as substrates for induced excitation and luminescent material sciences Luminescence Vasilis Pagonis, 2021-05-11 This book covers applications of R to the general discipline of radiation dosimetry and to the specific areas of luminescence dosimetry luminescence dating and radiation protection dosimetry It features more than 90 detailed worked examples of R code fully integrated into the text with extensive annotations The book shows how researchers can use available R packages to analyze their experimental data and how to extract the various parameters describing mathematically the luminescence signals In each chapter the theory behind the subject is summarized and references are given from the literature so that researchers can look up the details of the theory and the relevant experiments Several chapters are dedicated to Monte Carlo methods which are used to simulate the luminescence processes during the irradiation heating and optical stimulation of solids for a wide variety of materials This book will be useful to those who use the tools of luminescence dosimetry including physicists geologists archaeologists and for all researchers who use radiation in their research **Analysis of Thermally Stimulated Processes** Reuven Chen, Y. Kirsh, 1981 Thermally stimulated processes include a number of phenomena either physical or chemical in nature in which a certain property of a substance is measured during controlled heating from a low temperature Workers and graduate students in a wide spectrum of fields require an introduction to methods of extracting information from such measurements This book gives an interdisciplinary approach to various methods which may be applied to analytical chemistry including radiation dosimetry and determination of archaeological and geological ages In addition recent advances are included such as ionic thermocurrent of general order kinetics polarization thermocurrents and some aspects of the superlinear dependence on the dose of thermoluminescence

Proceedings of the International Symposium on Luminescence and Its Applications, 2000 *Solid State Dosimetry* Y. S. Horowitz, L. Oster, 2002 **Optical Inorganic Dielectric Materials and Devices** A. Krūmiņš, 1997 ICRU News, 1998 *Physics Briefs*, 1992 **Alerta**, 1974 **Chemical Abstracts**, 2002 Solid State Dosimetry T. Stoebe, 1984 **Proceedings**, 1999 The Engineering Index Annual, 1992 Since its creation in 1884 Engineering Index has covered virtually every major engineering innovation from around the world It serves as the historical record of virtually every major engineering innovation of the 20th century Recent content is a vital resource for current awareness new production information technological forecasting and competitive intelligence The world's most comprehensive interdisciplinary engineering database Engineering Index contains over 10.7 million records Each year over 500,000 new abstracts are added from over 5,000 scholarly journals trade magazines and conference proceedings Coverage spans over 175 engineering disciplines from over 80 countries Updated weekly Comprehensive Dissertation Index, 1984

Nuclear Science Information of Japan. Oral Presentation, 1998 **U.S. Government Research & Development Reports**, 1967

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