

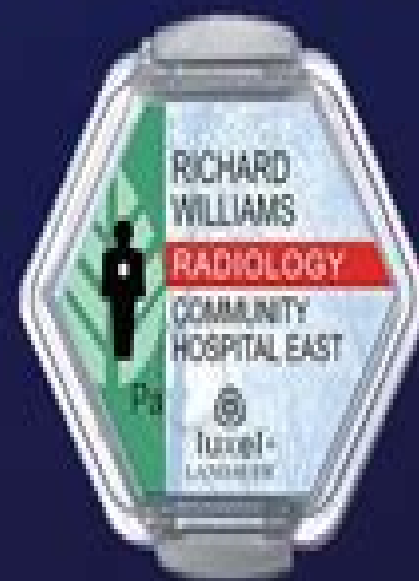
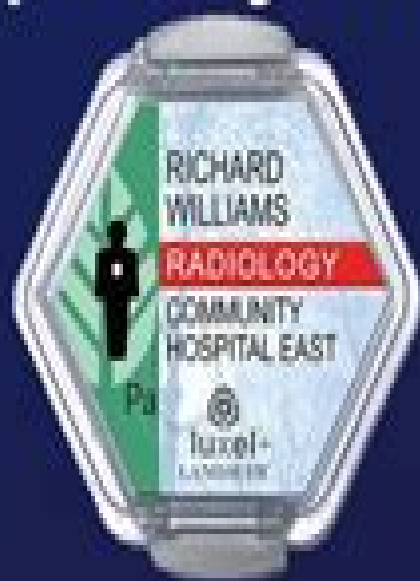


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OSLD

optically stimulated luminescence dosimeter



Optically Stimulated Luminescence Dosimetry

Claudio Furetta



Optically Stimulated Luminescence Dosimetry:

Optically Stimulated Luminescence Dosimetry L. Boetter-Jensen, S.W.S. McKeever, A.G. Wintle, 2003-10-24 Optically Stimulated Luminescence OSL has become the technique of choice for many areas of radiation dosimetry The technique is finding widespread application in a variety of radiation dosimetry fields including personal monitoring environmental monitoring retrospective dosimetry including geological dating and accident dosimetry space dosimetry and many more In this book we have attempted to synthesize the major advances in the field covering both fundamental understanding and the many applications The latter serve to demonstrate the success and popularity of OSL as a dosimetry method The book is designed for researchers and radiation dosimetry practitioners alike It delves into the detailed theory of the process from the point of view of stimulated relaxation phenomena describing the energy storage and release processes phenomenologically and developing detailed mathematical descriptions to enable a quantitative understanding of the observed phenomena The various stimulation modes continuous wave pulsed or linear modulation are introduced and compared The properties of the most important synthetic OSL materials beginning with the dominant carbon doped Al₂O₃ and moving through discussions of other less well studied but nevertheless important or potentially important materials The OSL properties of the two most important natural OSL dosimetry material types namely quartz and feldspars are discussed in depth The applications chapters deal with the use of OSL in personal environmental medical and UV dosimetry geological dating and retrospective dosimetry accident dosimetry and dating Finally the developments in instrumentation that have occurred over the past decade or more are described The book will find use in those laboratories within academia national institutes and the private sector where research and applications in radiation dosimetry using luminescence are being conducted Potential readers include personnel involved in radiation protection practice and research hospitals nuclear power stations radiation clean up and remediation food irradiation and materials processing security monitoring geological and archaeological dating luminescence studies of minerals etc

Optically Stimulated Luminescence Eduardo G. Yukihara, Stephen W. S. McKeever, 2011-02-16 Optically stimulated luminescence has developed into one of the leading optical techniques for the measurement and detection of ionizing radiation This text covers in a readable manner advanced modern applications of the technique how it can play a useful role in different areas of dosimetry and how to approach the challenges presented when working with optically stimulated luminescence The six chapters are as follows Introduction including a short history of OSL and details of successful applications Theory and Practical Aspects Personal Dosimetry Space Dosimetry Medical Dosimetry Other Applications and Concepts including retrospective and accident dosimetry environmental monitoring and UV dosimetry Throughout the book the underlying theory is discussed on an as needed basis for a complete understanding of the phenomena but with an emphasis of the practical applications of the technique The authors also give background information and relevant key references on each method inviting the reader to explore deeper into the subject independently

Postgraduate researchers and those involved with radiation dosimetry will find this book particularly useful. The material is both relevant and accessible for both specialists and those new to the field; therefore, it is fundamental to any academic interested in modern advances of the subject.

Characterization of a Commercial Optically Stimulated Luminescence Dosimetry System Bryan Remley, 2017. There is a need to better understand the risks of low level radiation dose in medical diagnostic procedures and ensure that dose measurements are accurate and traceable to National Standards. Users of instruments typically calibrate their dosimeters with one type of radiation beam with a specific photon energy spectrum referred to as beam quality and then may use these dosimeters to measure radiation in other types of radiation beam qualities over a different range of photon energies. This is not a problem if the dosimeter response is relatively constant for a broad range of photon energies. However, the response of the optically stimulated luminescent OSL dosimeters studied in this work have a relatively strong energy dependence for photons with energies less than 100 keV. Moreover, since this work focused on measuring doses in diagnostic units only where the mean photon energies are below 100 keV, using a single calibration based on an 80 kVp beam quality as provided by the vendor of the system could result in inaccurate dose measurements. To address this hypothesis as part of this work, the system was calibrated independently using other beam qualities that better match those of diagnostic units including RQR50, RQR60, M60, M80, and M100. Lamperti, O'Brien, 2001. Available at the National Institute of Standards and Technology, NIST. A comparison was then made of the air kerma measured by the OSL system using both the vendor's OSL reader calibration and the independent calibration implemented in this work. This comparison shows that when measuring air kerma in x-ray beams with beam qualities that have energy spectra different than the energy spectra of the x-ray beam in which the vendor prepared their calibration set (80 kVp x-ray beam), significant differences of up to 20% are observed. Because of this comparison, a set of beam quality correction factors (BQCF) were developed that allows correcting the air kerma values measured with the vendor's calibrated OSL system to account for the differences in energy spectra in the air kerma measurement for different beam qualities and ensuring traceability to the national standard for air kerma.

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

Optically Stimulated Luminescence (OSL) and Its Applications in Radiation Therapy Dosimetry Bin Hu,2010

Methodological Developments for Application of Optically Stimulated Luminescence (OSL) in Medical Dosimetry Patricia Berings Rio Gasparian,2009

Development of an Instrument for Spatially Resolved, Optically Stimulated Luminescence Dosimetry of Cobble and Dosimeter Surfaces Christopher Garcia,2023 Optically stimulated luminescence OSL dosimetry is a method used to determine the amount of energy stored within a crystalline insulator due to ionizing radiation At its most fundamental OSL dosimetry requires optical stimulation to induce a sample to emit luminescence a light detection apparatus to collect the luminescence signal and a calibrating radiation source to convert the acquired signal into an equivalent dose Conventional instruments have successfully integrated these components to perform OSL dosimetry on sediment and dosimeters In this dissertation an instrument was developed that improves upon commercially available instruments by providing spatial information that allows dose mapping The novel instrument LuCIDD Luminescence instrument with Confocal and Imaging unit for Dating and Dosimetry is based on the principles of a confocal microscope This dissertation outlines the requirements for spatially resolved dosimetry mapping and describes the design and construction of LuCIDD Tests of LuCIDD s lasers ability to perform spatially resolved stimulating measurements were made by measuring their focal spot size power density and penetration depth Used for calibration the built in X ray source s energy spectrum uniformity and dose rate were characterized The minimum resolution and stimulation time of measurements were determined quantifying the amount of time to complete a dose map of a sample s surface Lastly LuCIDD s ability to recover a known applied dose from single points was verified to provide a proof of concept for future dose mapping measurements

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

Protocols for Thermoluminescence and Optically Stimulated Luminescence Research at DOSAR. SM. Bernal, 2004 The Life Sciences Division LSD of Oak Ridge National Laboratory ORNL has a long record of radiation dosimetry research at the Dosimetry Applications Research DOSAR facility complex These facilities have been used by a broad segment of the research community to perform a variety of experiments in areas including but not limited to radiobiology radiation dosimeter and instrumentation development and calibration and materials testing in a variety of radiation environments Collaborations with the University of Tennessee Knoxville UTK have also led to important contributions in the area of archaeometry particularly as it relates to the use of radiation dosimetry to date archaeological artifacts This manual is to serve as the primary instruction and operation manual for dosimetric and archaeometric research at DOSAR involving thermoluminescence TL and optically stimulated luminescence OSL Its purpose is to 1 provide protocols for common practices associated with the research 2 outline the relevant organizational structure 3 identify the Quality Assurance plan and 4 describe all the procedures operations and responsibilities for safe and proper operation of associated equipment Each person who performs research at DOSAR using TL OSL equipment is required to read the latest revision of this manual and be familiar with its contents and to sign and date the manual s master copy indicating that the manual has been read and understood The TL OSL Experimenter is also required to sign the manual after each revision to signify that the changes are understood Each individual is responsible for completely understanding the proper operation of the TL OSL equipment used and for following the guidance contained within this manual The instructions protocols and operating procedures in this manual do not replace supersede or alter the hazard mitigation controls identified in the Research Safety Summary Thermoluminescence Optically Stimulated Luminescence Dosimetry for this research ORNL s Standards Based Management System or any other official guidelines

A Course in Luminescence Measurements and Analyses for Radiation Dosimetry Stephen W. S. McKeever, 2022-05-25 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 *Developments in Radiation Protection Dosimetry* E. P. Goldfinch,2004 *Solid
State Dosimetry* Francesco D'Errico,2006 Optically Stimulated Luminescence Dosimetry with NaCl Pellets Lovisa
Waldner,2021

**Commissioning of an Optically Stimulated Luminescence Dosimetry (OSLD) System for in Vivo
Dosimetry** Offormata Emmanuel Osunkwor,2018 A commercial OSL dosimetry system was investigated for passive in vivo
dosimetry in radiationtherapy Al₂O₃ C OSLDs have been characterized by various authors and researchers however an
AAPM protocol for its clinical use is still in progress In this work a system of nanoDots with the microStar reader Landauer
Inc was tested using typical radiotherapybeams in our clinic The goal was to fully characterize the system and determine all
thenecessary correction factors for accurate patient dose measurements The results demonstratethat our OSLD system is a
valid alternative to already established in vivo dosimetrymethods in our clinic **Questions And Answers On**

Thermoluminescence (TL) And Optically Stimulated Luminescence (Osl) Claudio Furetta,2008-11-25 Currently
thermoluminescence TL and optically stimulated luminescence OSL are the main techniques for studying the luminescence
properties of several materials mainly insulators called phosphors Frequently however students and experts alike need to
clarify some concepts related to the effects and defects present in the radiation interaction with solids generated by these
phenomena In this book a series of questions and corresponding answers give a clearer explanation about the concepts
theory and models related to TL and OSL including applications in important related areas Students researchers and
teachers will find this book a good guide for understanding TL and OSL as methods for studying the nature of luminescent
solids It provides a quick way for clearing doubts in the concepts and terminology concerning OSL and TL as it is intended to
answer many questions which can be encountered in practical applications **Proceedings of the International**

Symposium on Luminescence and Its Applications ,2000 Solid State Dosimetry Klaus Becker,1973 Bioceramics
23 Eyup Sabri Kayali,G. Göller,Ipek Akin,2011-10-27 Selected peer reviewed papers from the 23rd Symposium and Annual
Meeting of International Society for Ceramics in Medicine ISCM 2011 November 6 9 2011 Istanbul Turkey

Luminescence and Its Applications ,1995 Contributed articles presented at the National Seminar on Luminescence
and Its Applications **Proceedings of the International Conference on Luminescence Dosimetry** ,1965

Optically Stimulated Luminescence Dosimetry Book Review: Unveiling the Magic of Language

In an electronic era where connections and knowledge reign supreme, the enchanting power of language has become much more apparent than ever. Its ability to stir emotions, provoke thought, and instigate transformation is really remarkable. This extraordinary book, aptly titled "**Optically Stimulated Luminescence Dosimetry**," written by a very acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound impact on our existence. Throughout this critique, we will delve to the book's central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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