

1. Record Nr.	UNINA9910821005603321
Autore	Chen R (Reuven)
Titolo	Thermally and optically stimulated luminescence : a simulation approach // Reuven Chen, Vasilis Pagonis
Pubbl/distr/stampa	Chichester, : Wiley, 2011
ISBN	9786613405531 9781283405539 1283405539 9781119995760 1119995760 9781119993773 1119993776 9781119993766 1119993768
Edizione	[1st ed.]
Descrizione fisica	1 online resource (435 p.)
Classificazione	SCI074000
Altri autori (Persone)	PagonisVasilis
Disciplina	612/.014480287
Soggetti	Thermoluminescence Thermoluminescence dosimetry Optically stimulated luminescence dating
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Thermally and Optically Stimulated Luminescence: A Simulation Approach; Contents; About the Authors; Preface; Acknowledgements; 1 Introduction; 1.1 The Physical Mechanism of TL and OSL Phenomena; 1.2 Historical Development of TL and OSL Dosimetry; 1.3 Historical Development of Luminescence Models; 2 Theoretical Basis of Luminescence Phenomena; 2.1 Energy Bands and Energy Levels in Crystals; 2.2 Trapping Parameters Associated with Impurities in Crystals; 2.3 Capture Rate Constants; 2.4 Thermal Equilibrium; 2.5 Detailed Balance; 2.6 Arrhenius Model 2.7 Rate Equations in the Theory of Luminescence2.8 Radiative Emission and Absorption; 2.9 Mechanisms of Thermal Quenching in Dosimetric Materials; 2.10 A Kinetic Model for the Mott-Seitz

Mechanism in Quartz; 2.11 The Thermal Quenching Model for Alumina by Nikiforov et al.; 3 Basic Experimental Measurements; 3.1 General Approach to TL and OSL Phenomena; 3.2 Excitation Spectra; 3.3 Emission Spectra; 3.4 Bleaching of TL and OSL; 4 Thermoluminescence: The Equations Governing a TL Peak; 4.1 Governing Equations; 4.2 One Trap-One Recombination Center (OTOR) Model; 4.3 General-order Kinetics; 4.4 Mixed-order Kinetics; 4.5 Q and P Functions; 4.6 Localized Transitions; 4.7 Semilocalized Transition (SLT) Models of TL; 5 Basic Methods for Evaluating Trapping Parameters; 5.1 The Initial-rise Method; 5.2 Peak-shape Methods; 5.3 Methods of Various Heating Rates; 5.4 Curve Fitting; 5.5 Developing Equations for Evaluating Glow Parameters; 5.6 The Photoionization Cross Section; 6 Additional Phenomena Associated with TL; 6.1 Phosphorescence Decay; 6.2 Isothermal Decay of TL Peaks; 6.3 Anomalous Fading and Anomalous Trapping Parameters of TL; 6.4 Competition Between Excitation and Bleaching of TL; 6.5 A Model for Mid-term Fading in TL Dating; Continuum of Traps; 6.6 Photo-transferred Thermoluminescence (PTTL); 6.7 TL Response of Al₂O₃:C to UV Illumination; 6.8 Dependence of the TL Excitation on Absorption Coefficient; 6.9 TL Versus Impurity Concentration; Concentration Quenching; 6.10 Creation and Stabilization of TL Traps During Irradiation; 6.11 Duplicitous TL Peak due to Release of Electrons and Holes; 6.12 Simulations of the Duplicitous TL Peak; 7 Optically Stimulated Luminescence (OSL); 7.1 Basic Concepts of OSL; 7.2 Dose Dependence of OSL Basic Considerations; 7.3 Numerical Results of OSL Dose Dependence; 7.4 Simulation of the Dose-rate Dependence of OSL; 7.5 The Role of Retrapping in the Dose Dependence of POSL; 7.6 Linear-modulation OSL (LM-OSL); 7.7 Unified Presentation of TL, Phosphorescence and LM-OSL; 7.8 The New Presentation of LM-OSL Within the OTOR Model; 7.9 TL-like Presentation of CW-OSL in the OTOR Model; 7.10 Dependence of Luminescence on Initial Occupancy; OTOR Model; 7.11 TL Expression Within the Unified Presentation; 7.12 Pseudo LM-OSL and OSL Signals under Various Stimulation Modes; 7.13 OSL Decay and Stretched-exponential Behavior

Sommario/riassunto

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 c