1. Record Nr. UNINA9911004829903321

Autore	Furetta C. <1937->
Titolo	Handbook of thermoluminescence / / Claudio Furetta
Pubbl/distr/stampa	Singapore ; ; Hackensack, N.J., : World Scientific, c2010
ISBN	9786612757686 9781282757684 1282757687 9781615835201 1615835202 9789812838926 9812838929
Edizione	[2nd ed.]
Descrizione fisica	1 online resource (564 p.)
Disciplina	535.356
Soggetti	Thermoluminescence
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Bibliographic Level Mode of Issuance: Monograph
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	ch. A. Accuracy (definition). Activation energy (definition and properties). Activator. Adirovitch model. Afterglow. Aluminium oxide (Al[symbol]O[symbol]). Annealing (definition). Annealing (general considerations). Annealing procedures. Anomalous fading. Anomalous thermal fading. Area measurement methods (generality). Area measurement method (Maxia et al.). Area measurement methods (May and Partridge : general order). Area measurement methods (Muntoni et al. : general order). Area measurement method (Moharil : general order). Area measurement method (Moharil : general order, s = s(T)). Area measurement method (Rasheedy : general order). Arrhenius equation. Assessment of random uncertainties in precision of TL measurements (general). Atomic number (calculation) -- ch. B. Basic equation of radiation dosimetry by thermoluminescence. Batch of TLDs. Braunlich-Scharman model -- ch. C. Calcium fluoride (CaF[symbol]). Calibration factor F[symbol] (definition). Calibration factor F[symbol] (procedures). Calibration procedure for a batch of TLDs. Competition. Competitors. Computerised glow curve deconvolution (CGCD) : Kitis' expressions. Condition at the maximum (first order). Condition at the

maximum (first order) : remarks. Condition at the maximum (general order). Condition at the maximum (second order). Condition at the maximum when s' = s'(T) (second-order kinetics). Condition at the maximum when s = s(T) (general-order kinetics). Condition at the maximum when s = s(T) (first-order kinetics). Considerations on the heating rate. Considerations on the methods for determining E. Considerations on the symmetry factor, [symbol] , and the order of kinetics, b. Correction factor for the beam quality, F[symbol] (general). Curve fitting method (Kirsh : general order). CVD diamond -- ch. D. Defects. Delocalized bands. Determination of the dose by thermoluminescence. Dihalides phosphors. Dosimeter's background or zero dose reading (definition). Dosemeter's background or zero dose reading (procedure). Dosimetric peak. Dosimetric trap -- ch. E. Effect of temperature lag on trapping parameters. Energy dependence (procedure). Environmental dose rate (calculation). Environmental dose rate (correction factors). Erasing treatment. Error sources in TLD measurements. Exponential heating function (EHF).
ch. F. Fading (theoretical aspects). Fading factor. A fading based method for cheeking the presence of closely overlapping peaks in thermoluminescent (TL) materials. Fading : useful expressions. First-order kinetics when s = s(T). Fluorescence. Fluorapatite (Ca[symbol]F (PO[symbol])[symbol]). Frequency factor, s. Frequency factor, s (errors in its determination). Frequency factor and pre-exponential factor expressions -- ch. G. Garlick-Gibson model (second-order kinetics). General characteristics of first and second order glow-peaks. General-order kinetics when s = s(T). Geometrical characteristics of a single peak. Glow curve. Glow peak parameters -- ch. H. Heating rate effects. Heating rate effects on thermoluminescence of BaSO[symbol]:Eu+PTFE -- ch. I. In-vivo dosimetry (dose calibration factors). Inflection points method (Land : first order). Inflection points method (Singh et al. : general order). Initial rise method. Initial rise method when s = s(T) (Aramu et al.). Initialisation procedure. Integral approximation. Integral approximation when s = s(T). Interactive traps. Isothermal decay method (Garlick-Gibson : first order). Isothermal decay method (general). Isothermal decay method (May-Partridge : (a) general order). Isothermal decay method (May and Partridge : (b) general order). Isothermal decay method (Moharil : general order). Isothermal decay method (Takeuchi et al. : general order. Isothermal decay method : a new approach -- ch. K. Keating method (first-order, s = s(T)). Killer centres. Kinetic parameters determination : observations. Kinetics order : effects on the glow-curve shape -- ch. L. Light transmission of semi-transparent dosemeter. Linearisation factor, F[symbol] (general requirements for linearity). Linearity (procedure). Linearity test (procedure). Lithium borate (Li[symbol]B[symbol]O[symbol]). Lithium fluoride family (LiF).
Localized energy levels. Lower detection limit (D[symbol]). Luminescence (general). Luminescence (thermal stimulation). Luminescence centres. Luminescence dosimetric techniques. Luminescence dosimetry. Luminescence efficiency. Luminescence phenomena -- ch. M. Magnesium borate (MgO x nB[symbol]O[symbol]). Magnesium fluoride (MgF[symbol]). Magnesium orthosilicate (Mg [symbol]SiO[symbol]). May-Partridge model (general order kinetics). McKeever method. Mean and half-life of a trap. Metastable state. Method based on the temperature at the maximum (Randall-Wilkins). Method based on the temperature at the maximum (Urbach). Methods for checking the linearity. Model of non-ideal heat transfer in TL measurements. Multi-hit or multi-stage reaction models -- ch. N. Non linearity. Non-ideal heat transfer in TL measurements (generality).

Numerical curve fitting method (Mohan-Chen : first order). Numerical curve fitting methods (Mohan-Chen : second order). Numerical curve fitting method (Shenker-Chen : general order) -- ch. O. Optical bleaching. Optical fading. Oven (quality control). Observations on the peak-shape methods based on the peak temperature at the maximum -- ch. P-1. Partridge-May model (zero-order kinetics). Peak-shape method (Balarin : first- and second-order kinetics). Peak shape method (Chen : first- and second-order). Peak shape method (Chen : general-order kinetics). Peak shape method (Christodoulides : first- and general-order). Peak shape method (Gartia, Singh & Mazumdar : (b) general order). Peak shape method (Grossweiner : first order). Peak shape method (Halperin-Braner). Peak shape method (Lushchik : first and second order). Peak shape method (Mazumdar, Singh & Gartia : (a) general order). Peak shape method (parameters). Peak-shape methods based on the peak temperature at the maximum. Peak shape method when s = s(T). (Chen : first-, second- and general-order). Peak shape method : reliability expressions -- ch. P-2. Peak shift. Peak shift as a function of dose. Peak singularity. Perovskite's family (ABX[symbol]). Phosphorescence. Phosphors (definition). Photon energy response (calculation). Photon energy response (definition). Phototransferred thermoluminescence (PTTL) (general). Phototransferred thermoluminescence (PTTL) : model. Post-irradiation annealing. Post-readout annealing. Precision and accuracy (general considerations). Precision concerning a group of TLDs of the same type submitted to one irradiation. Precision concerning only one TLD undergoing repeated cycles of measurements (same dose). Precision concerning several identical dosimeters submitted to different doses. Precision concerning several identical dosimeters undergoing repeated and equal irradiation (procedures). Precision in TL measurements (definition). Pre-exponential factor. Pre-exponential factor (definition). Pre-irradiation annealing. Pre-readout annealing. Properties of the maximum conditions -- ch. Q. Quasiequilibrium condition -- ch. R. Radiation-induced-defects. Randall-Wilkins model (first-order kinetics). Rasheedy modified kinetics equations. Reading stability. Recombination centre. Recombination processes. Reference and field dosimeters (definitions). Relative intrinsic sensitivity factor or individual correction factor S [symbol] (definition). Relative intrinsic sensitivity factor or individual correction factor S[symbol] (procedures). Residual TL signal. Rubidium halide -- ch. S. Second-order kinetics when s' = s'(T). Self-dose in competition to fading (procedure). Sensitisation (definition). Sensitivity (definition). Sensitivity variations with optical transmission. Sensitivity variations with thickness of TLD. Set up of a thermoluminescent dosimetric system (general requirements). Simultaneous determination of dose and time elapsed since irradiation. Sodium pyrophosphate (Na [symbol]P[symbol]O[symbol]). Solid state dosimeters. Solid state dosimetry. Spurious thermoluminescence : chemiluminescence. Spurious thermoluminescence : surface-related phenomena. Spurious thermoluminescence : triboluminescence. Stability factor F[symbol] (definition). Stability factor F[symbol] (procedure). Stability of the reading system background. Stability of the reading system background (procedure). Stability of the TL response. Standard annealing. Stokes' law. Sulphate phosphors -- ch. T. Temperature gradient in a TL sample. Temperature lag : Kitis' expressions for correction (procedure). Temperature lag : Kitis' expressions for correction (theory). Temperature ratios [symbol] and [symbol] as a function of the kinetics order b. Theory of thermoluminescent dose measurement. Test for batch homogeneity. Test for the reproducibility of a TL system (procedure). Thermal cleaning (peak separation).

Thermal fading (procedure). Thermal quenching. Thermally connected traps. Thermally disconnected traps. Thermoluminescence (thermodynamic definition). Thermoluminescence (TL). Thermoluminescent dosimetric system (definition). Thermoluminescent materials : requirements. Three points method. Tissue equivalent phosphors. Trap characteristics obtained by fading experiments. Trap creation model. Trapping state. Tunnelling. Two-trap model (Sweet and Urquhart) -- ch. V. Various heating rates method (Bohum, Porfianovitch, Booth : first order). Various heating rates method (Chen-Winer : first order). Various heating rates method (Chen-Winer : second and general orders). Various heating rates method (Gartia et al. : general order). Various heating rates method (Hoogenstraaten: first order). Various heating rates method (Rasheedy). Various heating rates method (Sweet-Urquhart : two trap model). Various heating rate method when s = s(T) (Chen and Winer : first- and general-order) -- ch. Z. Zirconium oxide (ZrO[symbol]).

Sommario/riassunto

This second edition of the Handbook of Thermoluminescence enlarges on all the subjects which were treated in the first edition and adds further arguments, including the theory of thermoluminescent dose measurement, several examples concerning the kinetics parameters determination using various methods such as peak shape, isothermal decay, and so on. A special section is devoted to food irradiation, an important subject at the present time, and to the thermoluminescent characterization of the minerals extracted from the irradiated food. Another new section is devoted to the thermoluminescent phosphors and their main characteristics. The analytical treatments of the various thermoluminescent models are fully developed. As in the first edition, the arguments are given in alphabetical order to ease research. This second edition therefore aims to provide real practical support for researchers, students and personnel involved in radiation protection services, as well as in medical applications.