

1. Record Nr.	UNINA9910955287503321
Autore	Lakshmanan Arunachalam
Titolo	Luminescence and display phosphors : phenomena and applications / / Arunachalam Lakshmanan
Pubbl/distr/stampa	New York, : Nova Science Publishers, c2008
ISBN	1-61470-197-0
Edizione	[1st ed.]
Descrizione fisica	1 online resource (325 p.)
Disciplina	535/.35
Soggetti	Phosphors Luminescence
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 (p. [285]-300) and index.
Nota di contenuto	Intro -- LUMINESCENCE AND DISPLAY PHOSPHORS: PHENOMENA AND APPLICATIONS -- LUMINESCENCE AND DISPLAY PHOSPHORS: PHENOMENA AND APPLICATIONS -- CONTENTS -- PREFACE -- LUMINESCENCE AND DISPLAY PHOSPHORS - LIGHT EMISSION MECHANISMS AND APPLICATIONS -- INTRODUCTION -- FUNDAMENTALS OF LUMINESCENCE -- 1. FLUORESCENCE AND PHOSPHORESCENCE -- 2. LUMINESCENCE IN CONDENSED MEDIA AND STOKES SHIFT -- 3. LUMINESCENT MATERIALS AND EXCITATION PROCESSES -- 4. CRYSTAL FIELD EFFECT -- 4.1. Allowed and Forbidden Transitions -- 4.2. Energy Level Splitting -- 4.3. Stokes Shift -- 4.4. Life-Time and Line Broadening -- 4.5. Site Symmetry -- 5. ACTIVATORS AND KILLERS -- 6. THERMAL QUENCHING -- 7. CHARGE-TRANSFER TRANSITIONS -- 8. ACTIVATORS AND SENSITIZERS -- 9. EMISSION FROM MN ²⁺ ION -- 10. CONCENTRATION QUENCHING -- 11. MECHANISM OF EU -- 12. CONCENTRATION QUENCHING BY CROSS-RELAXATIONIN TB ³⁺ DOPED COMPOUNDS -- MERCURY BASED LAMP PHOSPHORS -- 1. COLOR CHROMATICITY COORDINATES -- 2. COLOR RENDERING INDEX -- 3. LUMINOUS EFFICACY -- 4. APPLICATION TO FL DESIGN -- 5. HG-PLASMA DISCHARGE -- 6. LOW PRESSURE HG-LAMP PHOSPHORS -- 7. QUANTUM AND ENERGY EFFICIENCIES -- 8. CHP PHOSPHOR -- 9. COMPACT FLUORESCENT LAMP -- 9.1. Blue CFL Phosphor -- 9.2. Green CFL Phosphor -- 9.3. Red CFL Phosphor -- 10. COLD CATHODE FLUORESCENT LAMP -- 11. MAINTENANCE OF A

PHOSPHOR -- 12. SUNTANNING LAMPS -- 13. BLACK LIGHT -- 14. SPECIALITY LAMPS -- CATHODOLUMINESCENCE PHOSPHORS -- 1. CATHODE RAY TUBE -- 2. PROJECTION TV -- 3. DISPLAY TUBES -- 4. CL PHOSPHORS -- 5. PHOSPHORS USED IN BLACK AND WHITE (MONOCHROME) CRT -- 6. PHOSPHORS USED IN COLOR CRTS -- 7. PHOSPHORS FOR PROJECTION COLOR CRT TV -- 7.1. Energy Conversion Efficiency -- 8. MECHANISM OF LUMINESCENCE IN DONOR-ACCEPTOR PAIR TYPE PHOSPHOR -- 8.1. Mechanism of "Killers" -- 9. AFTER-GLOW PERSISTENCE -- 10. PHOSPHOR LIFE-TIME. 11. BRIGHTNESS SATURATION AND EXCITATION DENSITY -- 12. MECHANISM OF BRIGHTNESS SATURATION IN TB3+ACTIVATED PHOSPHORS -- 13. MECHANISM OF BRIGHTNESS SATURATION IN OTHER PHOSPHORS -- 14. CONTRAST IMPROVEMENT -- 15. TEMPERATURE QUENCHING -- 16. TRANSITORY DECREASE IN LUMINESCENCE EFFICIENCY -- 17. PROBLEMS WITH BLUE PHOSPHORS -- 18. CAUSES OF LONG-TERM DETERIORATION OF LUMINESCENCE -- 19. PHOSPHORS FOR OSCILLOSCOPE TUBES -- 20. MECHANISM OF CL IN OXYGEN-DOMINATED PHOSPHORS -- 21. PHOSPHORS FOR RADAR TUBES -- VFD AND FED PHOSPHORS -- 1. PRINCIPLE OF VFD -- 2. DISADVANTAGES OF CRT -- 3. VFD PHOSPHORS -- 4. LOW ENERGY ELECTRON EXCITATION AND LUMINESCENCE EFFICIENCY -- 5. EFFECT OF DOPING ON THE LUMINANCE VS VOLTAGE CHARACTERISTICS -- 6. LUMINESCENCE RESPONSE TIME -- 7. FIELD EMISSION DISPLAYS -- 8. EFFICIENCY OF FED PHOSPHORS -- 9. PHOSPHOR REQUIREMENTS FOR FLAT PANEL FED -- 9.1. Red Phosphor Powders and Screens -- 9.2. Green Phosphor Powders and Screens -- 9.3. Blue Phosphor Powders and Screens -- 10. DEGRADATION OF ZNS PHOSPHORS UNDER ELECTRON BOMBARDMENT -- 11. A COMPARISON OF NEW PHOSPHORS FOR FED APPLICATION -- 12. Y₂O₃:TM THIN-FILM BLUE-EMITTING PHOSPHOR -- 13. THE ROLE OF PHOSPHOR MORPHOLOGY IN FED AND HDTV -- 14. THIN FILM PHOSPHORS FOR FED APPLICATION -- 14.1. ZnO:Zn -- 14.2. SrGa₂S₄:Ce -- 15. PHOSPHOR SYNTHESIS TECHNIQUES AND EFFICIENCY OF FPD PHOSPHORS -- 16. LUMINESCENCE PROCESS IN ZNO -- 17. OXYGEN VACANCIES AND PHOTOLUMINESCENCE IN ZNO -- 18. ZnGa₂O₄:Mn -- 19. SrTiO₃:Pr -- 20. OPTICAL CHARACTERISTICS OF THE PHOSPHOR SCREEN IN FED -- ELECTROLUMINESCENCE PHOSPHORS -- 1. METHODS OF PRODUCING EL -- 2. HOST MATERIALS FOR EL PHOSPHORS -- 3. REQUIREMENTS OF ACTIVATORS -- 4. THIN-FILM EL -- 5. ZNS BASED EL PHOSPHORS -- 6. RGB PHOSPHORS BASED ON ZNS -- 7. III-V HOSTS (GAN) -- 8. AC POWDER EL STRUCTURE -- 9. EL EXCITATION MECHANISM. 10. DEGRADATION CHARACTERISTICS -- 11. DC POWDER EL ("FORMING" PROCESS AND THE EXCITATION MECHANISM) -- 12. CURRENT-VOLTAGE CHARACTERISTICS -- 13. ENERGY BAND MODEL FOR DC POWDER EL -- 14. EXCITATION MECHANISM OF ZNS:TM -- 15. COLOR TUNING IN SULPHIDE PHOSPHORS -- 15.1. Band-Gap Luminescence -- 15.2. Red-Shift of Mn²⁺ Emission by Crystal-Field -- 16. BLUE EMITTING TFEL PHOSPHOR: SrS:Cu, Ag -- 16.1. Codoping in SrS:Cu⁺ -- 16.2. Thermal Quenching of SrS:Cu and SrS:Cu,Y -- 16. OXIDE BASED EL MATERIALS -- 17. RARE-EARTH DOPED GAN -- 18. THIN FILM AC EL (ACTFEL) -- 19. NANO PARTICLE EL -- FUTURE OUTLOOK -- LED PHOSPHORS -- 1. DRAWBACKS OF HG-DISCHARGE -- 2. WORKING PRINCIPLE OF LED -- 3. GAN LED AND WHITE LEDS -- 4. REQUIREMENTS OF LED PHOSPHORS -- 5. LED PHOSPHORS -- 6. EXCITATION AND EMISSION SPECTRA -- 6.1. YAG:Ce³⁺ -- 6.2. SrGa₂S₄:Eu²⁺ -- 6.3. -SiAlON:Eu²⁺ -- 7. NUV LED WITH TWO OR THREE BLEND PHOSPHORS -- 8. ENERGY EFFICIENCY -- 9. NEW PHOSPHORS -- 9.1. Eu²⁺ Doped Silicates -- 9.2. Novel Red Phosphors

for Solid-State Lighting -- 9.3. Multinary Nitrido Silicates -- 9.4. New Phosphors with High Eu^{3+} Concentration -- 9.5. Red fluorescence from $\text{CaAl}_2\text{O}_4:\text{Mn}^{2+}$ -- 10. LCD BACKLIGHT -- 11. NOVEL PHOSPHOR LCD -- QUANTUM DOTS -- PDP PHOSPHORS -- 1. FLAT PANEL DISPLAYS -- 2. VUV INTERACTION MECHANISM WITH PDP PHOSPHOR MATERIALS -- 3. REQUIREMENTS OF PDP PHOSPHORS -- 4. POSSIBLE CAUSES OF PHOSPHOR DAMAGE IN PDP -- 5. PRESENTLY USED PDP PHOSPHORS -- 5.1. Red Phosphors -- 5.2. Green Phosphors -- 6. THE QUANTUM EFFICIENCY -- 7. THE SCREEN EFFICIENCY -- 8. $\text{BaMgAl}_{10}\text{O}_{17}:\text{Eu}^{2+}$ -- 9. DETERIORATION OF COLOR QUALITY AND EFFICIENCY OF $\text{BaMgAl}_{10}\text{O}_{17}:\text{Eu}^{2+}$ -- 9.1. Role of Traps on Fluorescence Mechanisms -- 9.2. Al_2O_3 Nanocapsulation -- 9.3. Effect of Water on Thermal and Operating Degradation -- 9.4. Improved Thermal Resistance of $\text{BaMgAl}_{10}\text{O}_{17}:\text{Eu}^{2+}$ Prepared by SprayPyrolysis. 10. $\text{BaMgAl}_{12}\text{O}_{19}:\text{Mn}^{2+}+\text{GREEN}$ PDP PHOSPHOR -- 11. TSL STUDIES OF Eu^{2+} AND Mn^{2+} -DOPED BAM -- 12. OTHER BLUE PDP PHOSPHORS -- 12.1. $\text{CaAl}_2\text{O}_4:\text{Eu}^{2+}$ -- 12.2. $\text{LaPO}_4:\text{Tm}^{3+}$ -- 12.3. $\text{YAl}_3(\text{BO}_3)_4:\text{Gd}^{3+}$ -- SCINTILLATORS -- 1. SCINTILLATORS AND PHOSPHORS -- 2. REQUIREMENTS OF SCINTILLATORS -- 3. INORGANIC SCINTILLATORS -- 4. LUMINESCENCE PROCESSES IN INORGANIC SCINTILLATORS -- 4.1. Exciton Luminescence -- 4.2. Dopant Luminescence -- 4.3. Charge-Transfer Luminescence -- 4.4. CVL (Core-Valence Luminescence, Cross-Luminescence) -- 5. ENERGY CONVERSION AND RESOLUTION -- 6. X-RAY DETECTION -- 7. COMPUTED TOMOGRAPHY -- 8. PET IMAGING -- 9. COMPARISON OF CT SCINTILLATORS -- 10. NEW SCINTILLATORS - A COMPARISON -- 11. LUMINESCENCE PROCESS IN ORGANIC SCINTILLATORS -- 12. RADIATION HARDNESS -- 13. CROSS LUMINESCENCE -- 14. PARTICLE DISCRIMINATION -- 15. NUCLEAR DETECTORS -- 16. HIGH ENERGY PARTICLE DETECTOR -- 17. LIQUID SCINTILLATORS -- 18. WO_4 BASED SCINTILLATORS -- 19. La^{3+} AND Gd^{3+} -DOPED PbWO_4 -- 20. PbSO_4 SCINTILLATOR -- 21. SUPPRESSION OF AFTER GLOW IN CERAMIC SCINTILLATORS -- X-RAY IMAGE INTENSIFYING AND STORAGE PHOSPHORS -- 1. X-RAY IMAGING -- 2. IMAGE INTENSIFYING SCREENS AND STORAGE PHOSPHOR -- 3. CONSTRUCTION OF A CASSETTE AND INTENSIFYING SCREEN -- 4. TECHNICAL PARAMETERS OF INTENSIFYING SCREEN -- 4.1. Speed -- 4.2. Resolution -- 4.3. Types of Phosphor -- 4.4. Sharpness -- 4.5. Image Quality -- 4.6. Lag -- 5. X-RAY INTENSIFYING PHOSPHORS -- 5.1. CaWO_4 -- 5.2. $\text{YTaO}_4:\text{Nb}^{5+}$ -- 5.3. BaFCl and LaOBr -- 5.4. $\text{Gd}_2\text{O}_2\text{S}:\text{Tb}^{3+}$ and $\text{La}_2\text{O}_2\text{S}:\text{Tb}^{3+}$ -- 5.5. $\text{CsI}:\text{Na}$ -- 5.6. $\text{CsI}:\text{Ti}$ -- 6. DIGITAL IMAGING TECHNOLOGIES -- 6.1. Selenium Drum Detector (Thoravision) -- 6.2. CCD-Based Detectors -- 6.3. Flat-Panel Detector -- 6.4. Storage Phosphor -- 7. DIGITAL COMPUTED RADIOGRAPHY -- 8. PHOTOSTIMULATION PROCESS -- 9. CORRELATION OF TSL AND PSL -- 10. INFLUENCE OF WASHING IN METHANOL/WATER. 11. CRYSTAL MORPHOLOGY -- 12. NEUTRON IMAGING PLATES -- 13. OTHER PHOTOSTIMULABLE LUMINESCENCE PHOSPHORS -- 13.1. $\text{KCl}:\text{Eu}^{2+}$ -- 13.2. $\text{LiBaF}_2:\text{Eu}$ and $\text{LiBaF}_2:\text{Ce}$ -- 14. $\text{CSBR}:\text{Eu}^{2+}$ -- 14.1. Radiation hardness of $\text{CsBr}:\text{Eu}^{2+}$ -- DOWN AND UP-CONVERSION PHOSPHORS -- 1. DOWN CONVERSION -- 2. DOWN-CONVERSION TECHNIQUES -- 3. APPLICATIONS OF Pr^{3+} LUMINESCENCE -- 4. CONDITIONS FOR DC BASED PHOTON-CASCADE EMISSION -- 5. DRAWBACKS OF PCE IN $\text{YF}_3:\text{Pr}^{3+}$ -- 6. $\text{YF}_3:\text{Pr}^{3+},\text{Tm}^{3+}$ -- 7. VUV EXCITATION PROCESSES IN RE DOPED FLUORIDES -- 8. CENTROID SHIFT -- 9. OXIDE HOSTS -- 10. $\text{SrAl}_2\text{O}_7:\text{Pr}^{3+},\text{Mg}^{2+}$ -- 11. $\text{LaMgB}_5\text{O}_{10}:\text{Pr}^{3+}$ -- 12. $\text{SrB}_4\text{O}_7:\text{Pr}^{3+}$ AND $\text{Sr}_0.7\text{La}_0.3\text{Al}_{11}\text{Mg}_0.3\text{O}_{19}:\text{Pr}^{3+}$ -- 13. $\text{CaSO}_4:\text{Pr}^{3+}$, $\text{BaSO}_4:\text{Pr}^{3+}$ AND $\text{SrSO}_4:\text{Pr}^{3+}$ -- 14. CO-OPERATIVE ENERGY TRANSFER OF FIRST ORDER OR FIRST ORDER DC -- 15. LiGdF_4 :

EU3+ -- 16. PB2+ AS A SENSITIZER -- 17. LIGDF4:ER3+,TB3+ -- 18. CSGD2F7:ER3+,DY3+ -- 19. PR3+à MN2+ENERGY TRANSFER IN FLUORIDES -- 20. TM3+à MN2+ENERGY TRANSFER -- 21. YBO3:PR, TM/PR,ER AND YPO4:PR,TM/PR,ER -- 22. CO-OPERATIVE ENERGY TRANSFER OF SECONDORDER OR SECOND ORDER DC -- 23. APPLICATION OF SODC IN SOLAR CELLS -- 24. SODC BASED ON HOST ANION ABSORPTION -- 25. CASO4:Mn -- 26. CASO4:TB3+,NA+ -- 27. UP-CONVERSION PROCESSES -- 28. UC BY COOPERATIVE LUMINESCENCE -- 29. UC BY APTE EFFECT -- 29.1. Energy Transfer and UC in Y2O3:Sm and Gd2O3:Sm -- 30. UC BY COOPERATIVE SENSITIZATION -- 31. OTHER UC PROCESSES -- PERSISTENT AFTERGLOW PHOSPHORS -- 1. INTRODUCTION -- 2. NON-RADIOACTIVE SELF-LUMINOUS PHOSPHORBASED ON SRAL2O4:EU2+, DY3+ -- 3. MECHANISM OF PERSISTENT AFTER-GLOW -- 4. AN ALTERNATIVE MECHANISM OF THE PERSISTENT LUMINESCENCE OF CAAL2O4:EU2+ -- 4.1. Luminescence Centers -- 4.2. Structural Considerations -- 4.3. Effect of Stoichiometry on Persistent Luminescence -- 4.4. Effect of Sodium Co-Doping on Persistent Luminescence -- 4.5. Effect of Sm3+ and Yb3+ Co-Doping. 4.6. Effect of RE Co-Doping on the TSL Glow Curves.

Sommario/riassunto

This new book highlights the link between the luminescence phenomena of phosphors used in different displays. Both fluorescence (used in display phosphors) and phosphorescence (used in after glow phosphors and storage phosphors) mechanisms and the efforts made in phosphor synthesis to reduce the interference of one on another are dealt with in detail.