



Govt. V.Y.T. PG Autonomous College, Durg (Chhattisgarh)

(Erstwhile: Govt. Arts & Science College, Durg)

MoU Activity Report, Department of Physics

The memorandum of understanding was signed on 19 October 2019 between BIT Raipur & Department of Physics, Govt. VYTPG Autonomous College Durg. Agreement was made that BIT Raipur and Government Vishwanath Yadav Tamaskar Post-Graduate Autonomous College, Durg will each other help to provide infrastructure for training of students for the required level with the assistance and guidance of Government Vishwanath Yadav Tamaskar Post-Graduate Autonomous College, Durg and shall carry out training for synthesis of samples and its characterization. Dr. Vikas Dubey and his group of research carried out sample preparation and Thermo Luminescence (TL) studies in Department of Physics of Government Vishwanath Yadav Tamaskar Post-Graduate Autonomous College, Durg under MoU while Dr. Jagjeet Kaur Saluja & Dr Neha Dubey participated International Webinar at BIT Raipur. For patent discussion & interpretation was done at BIT Raipur. After signing MoU following activities were done

1. On 6 December 2019 a research paper entitled Thermoluminescence glow curve analysis and trap parameters calculation of UV induced $\text{La}_2\text{Zr}_2\text{O}_7$ phosphor doped with gadolinium was published in international journal Materials Science: Materials in Electronics. In this paper Thermoluminescence (TL) glow curve analysis and calculation of trap parameters are reported for gadolinium (Gd^{3+})-doped $\text{La}_2\text{Zr}_2\text{O}_7$ (LZO) phosphor. Phosphors were prepared by modified solid-state reaction method with varying concentration of Gd^{3+} (0.1–2.5 mol%) including proper calcination and sintering temperature. Structural analysis of prepared phosphor for optimized TL concentration was recorded by X-ray diffraction analysis technique. Morphology was analyzed by scanning electron microscopic technique. The UV ray



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induced to the phosphor and effect of dose response recorded for variable dose rates of UV and TL glow curve were observed. The experimental and theoretical comparison was done by computerized glow curve deconvolution technique which determines the trap parameters such as trap depth, order of kinetics, and frequency factor for optimized concentration of dopant. The trap parameters and trap model are discussed in detail.

Journal of Materials Science: Materials in Electronics
<https://doi.org/10.1007/s10854-019-02712-z>



Thermoluminescence glow curve analysis and trap parameters calculation of UV-induced $\text{La}_2\text{Zr}_2\text{O}_7$ phosphor doped with gadolinium

Neha Dubey¹ · Vikas Dubey²  · Janita Saji³ · Jagjeet Kaur¹

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Published online: 23 December 2019

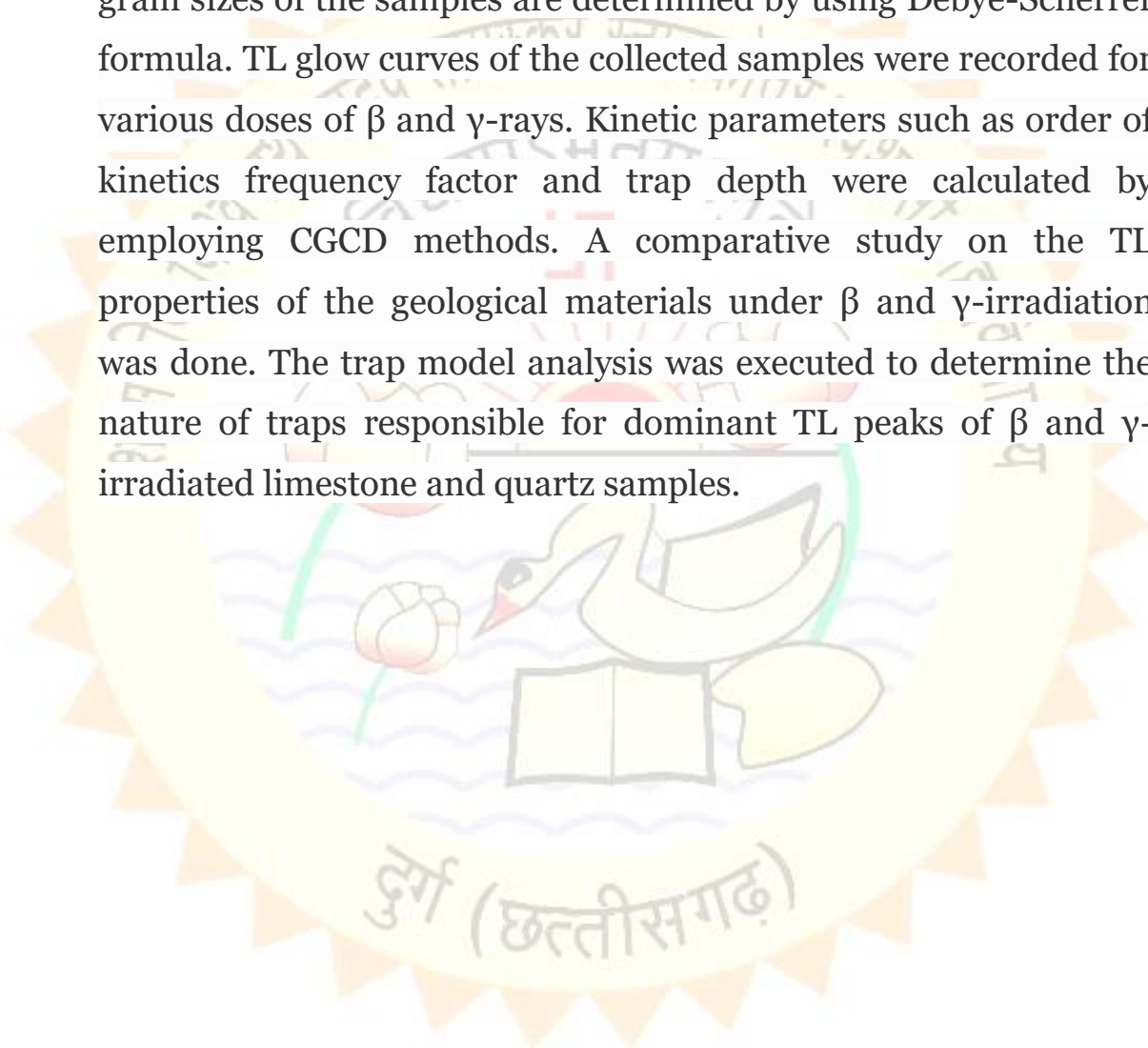
2. In year 2020, a research paper entitled Thermoluminescence Studies of β and γ -Irradiated Geological Materials for Environment Monitoring was published in Journal of Fluorescence. In this paper thermally stimulated luminescence (TSL) of quartz and limestone samples irradiated with β and γ -rays has been investigated. Herein the formation of trap depths and calculation of kinetic parameters of β



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and γ - irradiated quartz and limestone samples were studied through thermoluminescence (TL) glow curve analyses. The quartz and limestone samples were collected from various sites of Chhattisgarh (Patharia and Dalli-Rajhara mines). The collected raw samples were annealed at 400 °C. The phase formation of collected samples is confirmed by X-ray diffraction studies. The grain sizes of the samples are determined by using Debye-Scherrer formula. TL glow curves of the collected samples were recorded for various doses of β and γ -rays. Kinetic parameters such as order of kinetics frequency factor and trap depth were calculated by employing CGCD methods. A comparative study on the TL properties of the geological materials under β and γ -irradiation was done. The trap model analysis was executed to determine the nature of traps responsible for dominant TL peaks of β and γ -irradiated limestone and quartz samples.





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> J Fluoresc. 2020 Jul;30(4):819-825. doi: 10.1007/s10895-020-02536-9. Epub 2020 May 20.

Thermoluminescence Studies of β and γ -Irradiated Geological Materials for Environment Monitoring

Gu Cheng-Lin ¹, Vikas Dubey ², Kamal Kumar Kushwah ³, Manish Kumar Mishra ⁴, Ekta Pandey ⁵, Ratnesh Tiwari ⁶, Angesh Chandra ⁷, Neha Dubey ⁸

Affiliations + expand

PMID: 32430863 DOI: 10.1007/s10895-020-02536-9

Abstract

In the present report, thermally stimulated luminescence (TSL) of quartz and limestone samples irradiated with β and γ -rays has been investigated. Herein the formation of trap depths and calculation of kinetic parameters of β and γ - irradiated quartz and limestone samples were studied through thermoluminescence (TL) glow curve analyses. The quartz and limestone samples were collected from various sites of Chhattisgarh (Patharia and Dalli-Rajhara mines). The collected raw samples were annealed at 400 °C. The phase formation of collected samples is confirmed by X-ray diffraction studies. The grain sizes of the samples are determined by using Debye-Scherrer formula. TL glow curves of the collected samples were recorded for various doses of β and γ -rays. Kinetic parameters such as order of kinetics frequency factor and trap depth were calculated by employing CGCD methods. A comparative study on the TL properties of the geological materials under β and γ -irradiation was done. The trap model analysis was executed to determine the nature of traps responsible for dominant TL peaks of β and γ -irradiated limestone and quartz samples.

Keywords: Limestone; Quartz; TL glow curve; β and γ - rays.

3. An international workshop on Novel Material was organized on 29-30 January 2020. Professor from Belgium Dr. Dirk Poelman explained high intensity phosphor by particles and explained its importance and uses. He also explained how to get high intensity light through presentation. He explained blue and white light emitting diodes, importance of phosphor material in economical white lights source and Mn Base Phosphor materials. BIT Raipur assistant professor Dr. Vikas Dubey explained the importance of luminescence materials in the field of medical and explained its importance in detail. He also explained his current research field and subject. He also told students that we should come out of our comfort zone and should think like quantum particles and should think how we can teach society the importance of research. Dr. M.D. Marta



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Professor from Poland University gave her lecture on Anodization and explained its importance. Professors and students asked several questions to her while giving answers she stated their differences between Indian education system and Poland education system. She explained that in Poland has no policy like permanent employment. Every teacher gets employment according to their academy performance. Any degradation in the academic performance may cost their jobs, and because of that every teacher in Poland is conscious and responsible about the work. She also expressed her happiness towards the question asked by Indian students and professors of physics department. She had elaborate discussion on research project and education system and environment.



PHOTOGRAPHS DURING WORKSHOP

4. A three-day international webinar was organized by Government Viswanath Yadav Tamaskar Autonomous Postgraduate College Durg in



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collaboration with BIT Raipur and Luminescence Society of India on the topic "Effect of Corona on global level research and development" 24 June to 26 June 2020. Dr. Jagjeet Kaur Saluja, Convener, said that this webinar was attended by scientists from 6 countries as well as scientists and professors and researchers from 13 provinces of our India. These countries included scientists from countries such as Belgium, Taiwan, Poland, America, Japan etc. Initially Dr. Jagjeet Kaur Saluja, the convener of this webinar, gave a welcome speech. Thereafter, Dr. T. Rama Rao, Principal of BIT Raipur, gave the inaugural speech. Thereafter, Dr. Poelman Durk, a full professor at the University of Ghent, Belgium, presented his lecture on the topic "Near Infrared Persistent Luminescence for Medical Imaging". After Prof. Dirk's lecture, Prof. Dr. KVR Murthy of MS University, Baroda, while given a lecture on "The elimination of corona virus by 254 nanometer wavelength of ultraviolet light", highlighted the importance of physical distance at the time of Corona epidemic and at home Stayed advised to work. Prof. Dr. Sudipta Som of the National Taiwan University of Taipei presented his lecture on the topic "White-light LEDs". His life was presented by Dr. Neha Dubey, post-doctoral fellow and woman scientist of the college. Prof. Dr. Mikalska Domanska Marta, speaker of the University of the Military Technical University, presented his views on the topic "Introduction to Anode oxide, Morphology and Properties Influenced by Anodization Conditions and Their Applications". He was introduced by Dr. Mo. Khwaja Moinuddin, Professor of BIT Raipur and Dr. Poorna Bose, HOD.



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INTERNATIONAL WEBINAR SERIES, JUNE' 2020 In Association with Luminescence Society Of India Worldwide Effect of COVID on Research & Development	
JUNE 24	INAGURAL, 11:00 AM TO 11:10 AM, By Dr. R. N. Singh INAGURAL, 11:10 AM TO 11:15 AM, By Dr. T. Ramarao SESSION 1: DR POELMAN DIRK, BELGIUM 11:15 AM SESSION 2: DR K V R MURTHY, INDIA 11:45 AM SESSION 3: DR SUDIPTA SOM, TAIWAN 12:15 PM
JUNE 25	SESSION 1: DR KANDALAM RAMANUJACHARY, NEW JERSEY 05:30 PM SESSION 2: DR SHUBHASH, NEW JERSEY 6:00 PM SESSION 3: DR. MICHALSKA DOMANSKA MARTA, POLAND 06:30 PM
JUNE 26	SESSION 1: DR. DHANANJAY KUMAR DESHMUKH, JAPAN 4:30 PM SESSION 2: DR S J DHOBLE, INDIA, 5:00 PM Validictory, 5:30 PM TO 5:45 PM,
ALL TIMINGS OF SESSION ARE AS PER IST, KOLKATA, INDIA HOW TO REGISTER: Registration link: https://forms.gle/fYCMrDSUYWJ9CyyT8 About Webinar The moto behind organizing this webinar is to throw light on current scenario of research and development in various parts of world with exploring the various possibilities and new ventures for research and development sector. The webinar will provide a common platform to all the researchers, academicians and industrial professionals throughout the globe for sharing the views in context with current pandemic situation.	



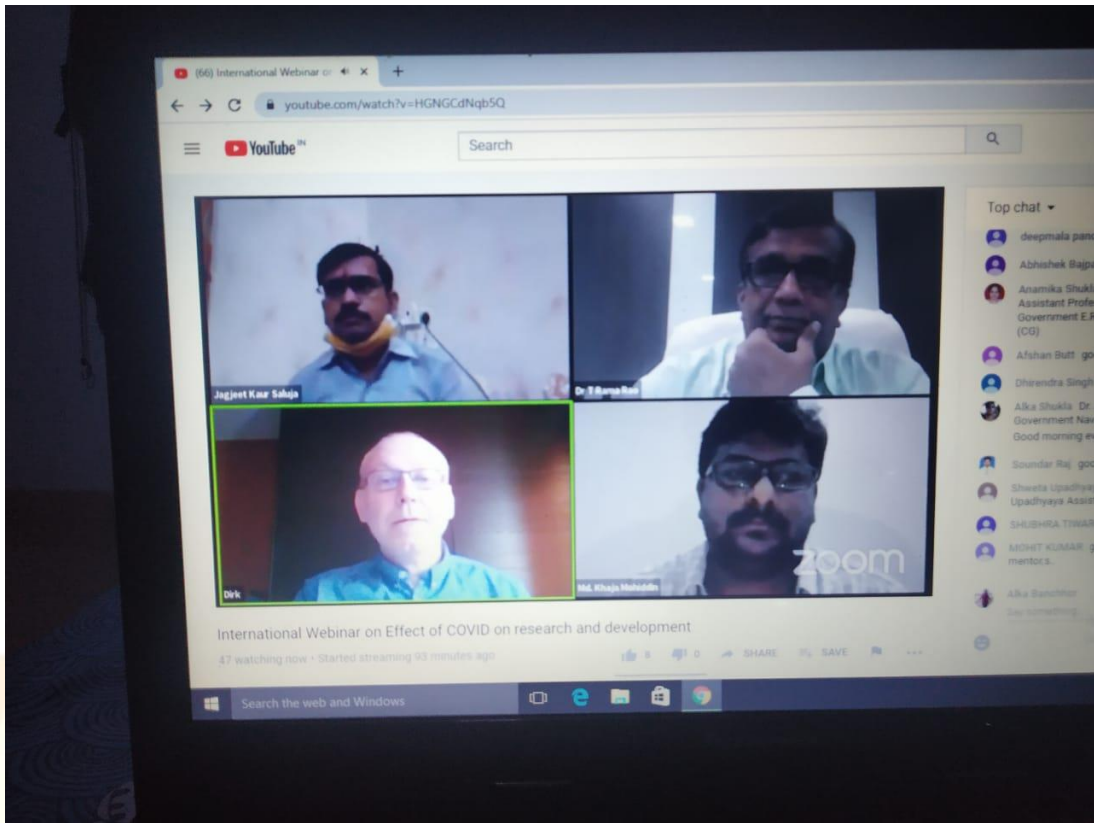
Organizing Team:
CHIEF PATRON
Dr R. N. Singh, Principal, Govt. V.Y.T. PG. Auto. College Durg
Dr. T. Ramarao, Principal, BIT Raipur
Dr K V R Murthy, President, Luminescence Society of India
PATRON
Dr Purna Bose, Govt. V.Y.T. PG. Auto. College Durg
Dr. R. K .Mishra, Dean Administration, BIT Raipur
CONVENOR
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CO-CONVENOR
Prof. Amit Thakur, Dean R&D, BIT Raipur
Dr. Vikas Dubey, Asst Dean R&D, BIT Raipur
ORGANISING SECRETARY
Dr. R.S. Singh
Dr. Abhishek Mishra
Dr. Ratnesh Tiwari
CO-ORGANIZERS
Dr. Anita Shukla
Mrs. Siteshwari Chandrakar
Organised By:
Department of Physics, Govt. V.Y.T.PG. Auto.
College Durg, C.G., India
Bhilai Institute of Technology Raipur, C.G., India
In Association with Luminescence Society of India

Prof. Dr. Kandalam Ramanujachary from Rowan University, New Jersey, gave his lecture on the topic of "Drug Delivery". He was welcomed by Dr. KVR Murthy. Dr. Dhananjay Kumar Deshmukh, speaker of Chubhu University, Japan, gave his views on the topic "Covid-19 and its impact on R&D at global level". Dr. Shweta Tiwari gave his life introduction. Dr. SJ Dhoble, Professor, RTM University, Nagpur, presented his lecture on the topic "Phosphorus for Ink and Its Applications". At the end of the program, the Chief Patron of the webinar, Dr. T. Rama Rao and Convenor Dr. Jagjeet Kaur Saluja & Dr. Vikas Dubey presented the conclusion of this webinar. A vote of thanks was done by Dr. Neha Dubey. Total 170 participants were present in this webinar.



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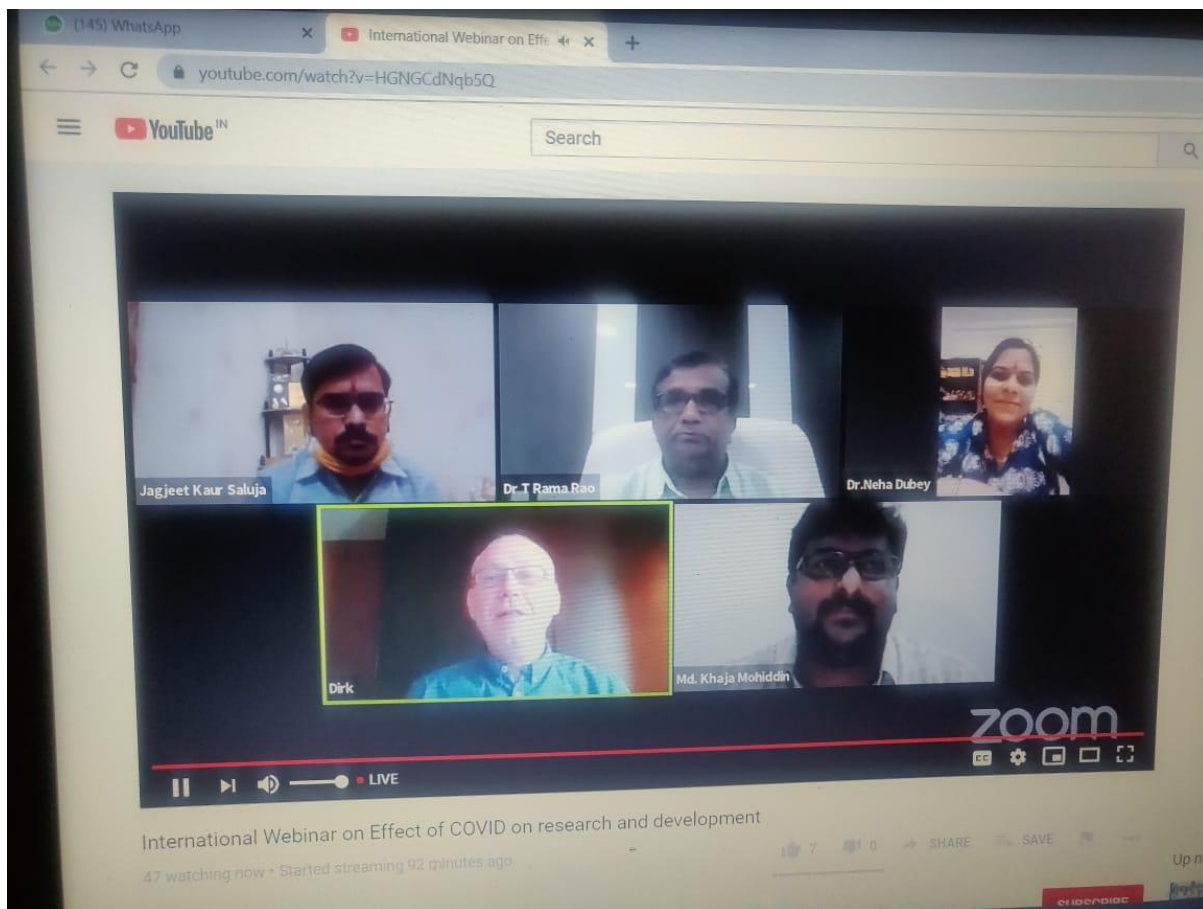
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PHOTOGRAPHS DURING INTERNATIONAL WEBINAR

5. On 28 April 2021, a research paper entitled Composite nature of thermo luminescence studies in Dy^{3+} activated $Sr_2ZnSi_2O_7$ phosphor was published in Optik journal. In this paper we reported the thermo-luminescent properties of Dy^{3+} activated $Sr_2ZnSi_2O_7$ phosphors synthesized via solid-state reaction method. The synthesized phosphors were characterized via X-ray diffraction, transmission electron microscopy, Fourier transform infrared spectroscopy and thermoluminescent techniques. Thermoluminescence (TL) glow curve analysis of prepared Dy^{3+} -activated $Sr_2ZnSi_2O_7$ phosphors were recorded for different UV exposure time and found linear response with dose. The TL glow curve shows composite in nature and broad glow curve centered at $309^\circ C$ were found. Composite TL glow curve extracted by glow fit program using computerized glow curve deconvolution (CGCD) technique and corresponding kinetic



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parameters are calculated. The obtained results indicate that the synthesized phosphors find potential applications in the fields of dosimetric applications.

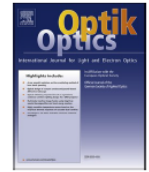
Optik - International Journal for Light and Electron Optics 241 (2021) 166904



Contents lists available at ScienceDirect

Optik

journal homepage: www.elsevier.com/locate/ijleo



Original research article

Composite nature of thermo luminescence studies in Dy³⁺
activated Sr₂ZnSi₂O₇ phosphor

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6. On 25 May 2021, a research paper entitled White light emission and thermoluminescence studies of Dy³⁺ activated Hardystonite (Ca₂ZnSi₂O₇) phosphor was published in Luminescence journal. Here, we reported the photoluminescence and thermoluminescent properties of Dy-activated Ca₂ZnSi₂O₇ phosphors synthesized using the solid-state method. The synthesized phosphors showed hardystonite type structure, and had micron-sized particles. Fourier transform infrared spectroscopy (FTIR) showed the existence of the functional groups and confirmed the formation of phosphor and photoluminescence techniques. The phosphors under excitation at 239 nm exhibited green-yellow emission spectra in the region 481–575 nm corresponding to the 4F_{9/2}→6H_{15/2} transitions of Dy³⁺ ions. The CIE coordinates were achieved to be (0.25, 0.27), which was narrowly close to the white region. Thermoluminescence (TL) glow curve analysis of prepared Dy³⁺-activated Ca₂ZnSi₂O₇ phosphors were recorded for different ultraviolet (UV) light exposure times and found to have a linear response with dose. The TL glow curves, recorded with various UV exposure times ranging from 5 to 25 min, showed a linear



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response with dosage. The corresponding kinetic parameters were also calculated using a computerized glow curve deconvolution (CGCD) technique. Activation energy was observed to enhance the increase in the peak temperature and its value was substantially higher for the third peak fitted using CGCD. The obtained results indicated that the synthesized pristine phosphors could be potentially used for lighting, displays, and dosimetric applications.

Received: 29 March 2021 | Revised: 24 May 2021 | Accepted: 25 May 2021
DOI: 10.1002/bio.4095

RESEARCH ARTICLE

LUMINESCENCE WILEY
The Journal of Biological and Chemical Luminescence

White light emission and thermoluminescence studies of Dy³⁺-activated hardystonite (Ca₂ZnSi₂O₇) phosphor

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Abstract

Here, we report the photoluminescence and thermoluminescent properties of Dy-activated Ca₂ZnSi₂O₇ phosphors synthesized using the solid-state method. The synthesized phosphors showed hardystonite type structure, and had micron-sized particles. Fourier transform infrared spectroscopy (FTIR) showed the existence of the functional groups and confirmed the formation of phosphor and photoluminescence techniques. The phosphors under excitation at 239 nm exhibited green-yellow emission spectra in the region 481–575 nm corresponding to the ⁴F_{9/2}→⁶H_{15/2} and

7. Prof Jagjeet Kaur Saluja has published an international book on PHOSPHORS FOR DISPLAY FORENSIC AND BIOMEDICAL APPLICATIONS Nova publisher New York in collaboration with Dr. Marta Michalska-Domańska Military University of Technology Warsaw, Poland & Dr. Vikas Dubey BIT RAIPUR in 2021.



**Govt. V.Y.T. PG Autonomous College, Durg
(Chhattisgarh)**

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**PHOSPHORS FOR DISPLAY, FORENSIC
AND BIOMEDICAL APPLICATIONS**

VIKAS DUBEY

MARTA MICHALSKA-DOMAŃSKA

NEHA DUBEY

AND

JAGJEET KAUR SALUJA

EDITORS

8. Six patents were also granted, entitled A process for preparing calcium zirconate for UV LED devices for treating neonatal and skin diseases, A method for evaluating thermally stimulating luminescence behavior Er^{3+} , Yb^{3+} doped $\text{La}_2\text{Zr}_2\text{O}_7$ phosphor for TL dosimeter, SOCIO ECONOMICAL SMART IOT BASED TRAFFIC MANAGEMENT SYSTEM by Australian Government in 2021.



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Australian Government

IP Australia

CERTIFICATE OF GRANT INNOVATION PATENT

Patent number: 2021102599

The Commissioner of Patents has granted the above patent on 16 June 2021, and certifies that the below particulars have been registered in the Register of Patents.

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Shubhra Mishra of Professor Department of Physics, Shri Shankaracharya Institute of, Professional Management and Technology Raipur Chhattisgarh 492015 India

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J. P. Patra of Professor & Head, Department of Computer, Science and Engineering, Shri Shankaracharya



Australian Government

IP Australia

CERTIFICATE OF GRANT INNOVATION PATENT

Patent number: 2021101673

The Commissioner of Patents has granted the above patent on 23 June 2021, and certifies that the below particulars have been registered in the Register of Patents.

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Praveen Kumar Yadaw of Material Science Research Lab, School of Science, ISBM University, Kosmi (Nawapara) Block: Chhura Distt: Gariyaband Chhattisgarh 493996 India

Title of invention:

A method for evaluating thermally stimulating luminescence behaviorEr³⁺, Yb³⁺ doped La₂Zr₂O₇ phosphor for TL dosimeter


Name of inventor(s):

Dubey, Neha; Saluja, Jagjeet Kaur; Swamy, N. Kumar; Deshmukh, Ram Krishna; Mishra, Manish Kumar; Dubey, Vikas; Verma, Om Prakash and Yadaw, Praveen Kumar



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Australian Government
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CERTIFICATE OF GRANT INNOVATION PATENT

Patent number: 2021101844


The Commissioner of Patents has granted the above patent on 19 May 2021, and certifies that the below particulars have been registered in the Register of Patents.

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Navneet Seth of Baba Hira Singh Bhattal, Institute of Engineering & Technology Lehragaga Punjab 148031 India
Nitu Maurya of Institute of Professional Excellence, and Management (IPEM), A-13/1 South Side G.T Road Industrial Area, Ghazalabad, Uttar Pradesh 201010 India
Ramesh Chandra Panda of Research & Development Cell, Synergy Institute of Engineering & Tech. Dhenkanal Odisha 759001 India

Title of Invention:
SOCIO ECONOMICAL SMART IOT BASED TRAFFIC MANAGEMENT SYSTEM

Name of Inventor(s):
Dipen Derashri, Purvi, Saurabh, Praneet, Setta, Sonia, Sood, Kiran, Vyas, Sonali, Sakhlecha, Manish, Dubey, Neha, Sinha, Hemlata, Kumar Tiwari, Manoj, Seth, Navneet, Maurya, Nitu and Chandra Panda, Ramesh

Term of Patent:
Eight years from 10 April 2021

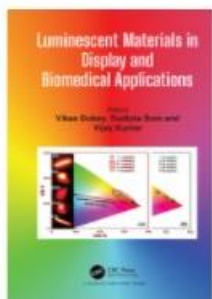
 Dated this 19th day of May 2021

9. Two chapters in book CRC Press Luminescent Materials in Display and Biomedical Applications has published are
- (a) Effect of CaZrO_3 doping by Gd^{3+} on phototherapy lamp phosphor performance
 - (b) Phosphors in role of magnetic resonance, medical imaging and drug delivery applications: A review



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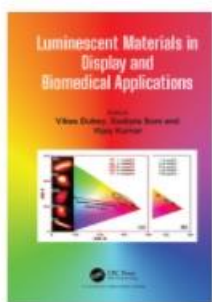
Chapter

Phosphors in Role of Magnetic Resonance, Medical Imaging and Drug Delivery Applications: A Review

By Neha Dubey, Vikas Dubey, Jagjeet Kaur, Dhananjay Kumar Deshmukh, K.V.R. Murthy

Book [Luminescent Materials in Display and Biomedical Applications](#)

Edition	1st Edition
First Published	2020
Imprint	CRC Press
Pages	22
eBook ISBN	9780429025334



Chapter

Effect of CaZrO₃ Doping by Gd³⁺ on Phototherapy Lamp Phosphor Performance

By Neha Dubey, Marta Michalska-Domańska, Jagjeet Kaur Saluja, Janita Saji, Vikas Dubey

Book [Luminescent Materials in Display and Biomedical Applications](#)

Edition	1st Edition
First Published	2020
Imprint	CRC Press
Pages	11
eBook ISBN	9780429025334

10. Two chapters in book Hybrid Perovskite Composite Materials Design to Applications Woodhead Publishing Series in Composites Science and Engineering has published are

- Spectroscopic parameters of red emitting Eu³⁺ doped La₂Ba₃B₄O₁₂ phosphor for display and forensic applications



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(b) Enhancement of photoluminescence / phosphorescence properties of
 Eu^{3+} doped $\text{Gd}_2\text{Zr}_2\text{O}_7$ phosphor



Hybrid Perovskite Composite Materials

Design to Applications

Woodhead Publishing Series in Composites Science and Engineering

2021, Pages 169-180



7 - Spectroscopic parameters of red emitting Eu^{3+} -doped $\text{La}_2\text{Ba}_3\text{B}_4\text{O}_{12}$ phosphor for display and forensic applications

Neha Dubey ^a, Marta Michalska-Domańska ^b, Janita Saji ^c, Vikas Dubey ^d, Jagjeet Kaur Saluja ^a

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Springer Link



[International Conference on Intelligent Computing and Smart Communication 2019](#) pp 805-809 | [Cite as](#)

Determination of Spectroscopic Parameters via Judd–Ofelt Analysis of Eu^{3+} Doped $\text{La}_2\text{Zr}_2\text{O}_7$ Phosphor

Authors

Authors and affiliations

Neha Dubey , Jagjeet Kaur, Vikas Dubey, Manish Kumar Mishra

Conference paper

First Online: 20 December 2019

715

Downloads

Part of the [Algorithms for Intelligent Systems](#) book series (AIS)

Chapter

Enhancement of photoluminescence/phosphorescence properties of Eu^{3+} -doped $\text{Gd}_2\text{Zr}_2\text{O}_7$ phosphor

January 2021

DOI:10.1016/B978-0-12-819977-0.00012-3

In book: Hybrid Perovskite Composite Materials (pp.259-266)

Authors:



Neha Tiwari

Government V.Y.T.PG. Autonomous Coll...



Vikas Dubey

Bhilai Institute Of Technology



T. Ramarao



Jagjeet Kaur Saluja

