

Profile

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Rajni

Assistant Professor (Contract)
Department of Physics

Qualification

- **Ph.D. Physics (pursuing)**, Department of Physics, Chaudhary Devi Lal University, Sirsa (Haryana) India-125055. *Supervisor-* Dr. Rachna Ahlawat, (Associate Professor), Department of Physics, Chaudhary Devi Lal University, Sirsa (Haryana) India-125055
- **CSIR-UGC-NET (March-2015)**
- **M.Sc. Physics (2008)**, Department of Physics, Chaudhary Devi Lal University, Sirsa (Haryana)-125055.
- **B.Sc. (2006)**, C.M.K. national PG Girls' College, Sirsa (Haryana)-125055.

Teaching Experience

- **Assistant Professor (Contract)** Department of Physics, Chaudhary Devi Lal University, Sirsa, (Haryana), India (14 march-2016-Till Date).
- Department of Physics, Chaudhary Devi Lal University, Sirsa, (Haryana), India (12-August-2014-31-May-2015).
- JCD Memorial College of Engineering, Sirsa, (Haryana), India (1 Sept. 2010-31May-2012).

Teaching courses

- To M.Sc. Students-Mathematical Physics, Classical Electrodynamics, Solid State Physics, Materials Sciences, Environmental Physics.

Research Area

- My Ph.D. research topic is ‘**Synthesis and Characterizations of Some Lanthanides Doped Rare Earth Oxides**’. Briefly, my research work emphasizes the structural, Thermal, and optical properties of Rare earth oxides doped with some Lanthanides. We are also studying its application in removing hazardous dyes from wastewater.

Research Interests

Optical materials, Metal Oxides, Nanomaterials, Lanthanides, Rare-Earth Oxides etc.

List of Publications

A. Research Papers in International Journals:

1. **Rajni Vats** and Rachna Ahlawat, “**Impact of Annealing Time on Structural Evolution of Pure and Dy³⁺-Doped CeO₂ Nanopowder, Rietveld Refinement and Optical Behavior**” International Journal Of Nanoscience, Vol. 20, (2021) 2150033 (I. F. = 0.68) ISSN (print): 0219-581X, ISSN (online): 1793-5350.
2. **Rajni Vats** and Rachna Ahlawat, “**Synthesis and Characterizations of Dy³⁺ doped Y₂O₃:SiO₂ nanopowder**”, International Journal of Movement Education and Social Science, Vol. 7, (2018) 129 (UGC approved Journal Index No. 41683, I. F. 5.62) ISSN (Print): 2278-0793, ISSN (Online): 2321-3779.
3. Chitra Bhukkal, **Rajni Vats**, Bindiya Goswami, Neelam Rani, Rachna Ahlawat, “**Crystallographic and electro-optic analysis of pure and Cu/Mn-doped Cd_{0.6}Zn_{0.4}O ternary alloy: Role of the defect states and imperfection density**”, Materials Science & Engineering B (Elsevier), 270 (2021) 115214, (I. Factor = 4.7).
4. Chitra Bhukkal, **Rajni Vats**, Bindiya Goswami, Neelam Rani, Rachna Ahlawat, “**Zinc content (x) induced impact on crystallographic, optoelectronic, and photocatalytic parameters of Cd_{1-x}Zn_xO (0≤x≤1) ternary nanopowder**” Materials Science & Engineering B (Elsevier) 265 (2021) 115001 (I.F. = 4.7) ISSN: 0921-5107.
5. Chitra Bhukkal, **Rajni Vats**, Bindiya Goswami, Neelam Rani, Rachna Ahlawat, “**Effect of annealing on layered Cu doped Cd(OH)₂-CdO nanopowder and investigation of different intermediate phases, optical and dc-electrical properties**”, Materials Today Communications, **25** (2020) 101608 (Elsevier, Impact Factor = 3.4), ISSN: 2352-4928.
6. C. Bhukkal, **Rajni Vats**, B. Goswami, N. Rani, **Rachna Ahlawat**, “**Mn²⁺ doped CdO Nanopowder: Synthesis, phase conversion and characterizations via a temperature-dependent**

mechanism” Journal of Electronic Materials (Springer) 51 (2022) 1717-1730 Print ISSN: 0361-5235. (Impact Factor = 1.9).

B. Paper in Conference Proceedings:

1. **Rajni Vats**, Chitra Bhukkal, Bindiya Goswami, Neelam Rani, and Rachna Ahlawat, “**Structural and Dye Degradation Study of Cubic Nanocrystalline Yttria**”, AIP Conference Proceedings, 2352, (2021) 040035-1–5.
2. **Rajni Vats** and Rachna Ahlawat, “**Structural and Optical Investigations of Gd₂O₃:Dy³⁺ Nanophosphor**”, AIP Conference Proceedings 2142, (2019) 010001.
3. Chitra Bhukkal, **Rajni Vats**, Bindiya Goswami, Neelam Rani, Rachna Ahlawat, “**Study of Crystallographic Modification in Cadmium Oxide (CdO) Nanocrystallites due to Doped Transition Metal (TM) Ions**”, AIP Conference Proceedings 2352, (2021) 040005.
4. Neelam Rani, Bindiya Goswami, **Rajni Vats**, Chitra Bhukkal, Rachna Ahlawat, “**Yb Doped SiO₂ Nanorods Prepared by Sol-Gel Method**”, AIP Conference Proceedings, 2352, (2021) 040026.
5. Bindiya Goswami, Neelam Rani, **Rajni Vats**, Chitra Bhukkal, Rachna Ahlawat, “**Highly Crystalline and Narrow Bandgap MgAl₂O₄: Synthesis and Characterization**”, AIP Conference Proceedings, 2352, (2021) 020045.

C. Papers Published as Book Chapter:

1. **Rajni Vats** and Rachna Ahlawat, “**Structural Investigations of Dy³⁺ Doped Cubic Gd₂O₃ Nanopowder via Rietveld Refinement**” (Book Chapter-26) in book-series of springer proceedings in Physics, (International Conference on Atomic Molecular, Optical and Nano Physics with Applications) edited by Vinod Singh, Rinku Sharma, Manmohan, Mohan Mehta and A. K. Razdan, (2022), 263-271, ISBN No.: 978-981-16-7690-1 (Springer Nature).
2. Chitra Bhukkal, **Rajni Vats**, Rachna Ahlawat, “**Structural and Optical Study of Mn doped CdO nanoparticles**” (Book Chapter) in the edited book titled “**Nanochemistry**” by Vijaya Tomar, Co-editor: Mrs. Anshu Uppal, Published by Anu Books, New Delhi (2019), ISBN No.: 978-93-82166-87-0.

D. Paper presented in International Conferences:

1. “**Structural and bandgap modulation in Cubic Fluorite type Ceria: Effect of Annealing**” International Conference on Frontiers in Physics, Materials Science and Nanotechnology (FPMSN-2022) held at Department of Physics, Chaudhary Devi Lal University, Sirsa-125055 (Haryana), India on 25-26 March, 2022.
2. “**Structural Investigations of Dy³⁺ Doped Cubic Gd₂O₃ Nanopowder via Rietveld Refinement**” International conference on Atomic, Molecular, Optical and Nano Physics with Application

(CAMNP-2019) held at Department of Applied Physics, Delhi Technological University, Delhi-110042, India, during 18-20 December, 2019.

3. **“Structural and Optical Investigations of Gd₂O₃:Dy³⁺ Nanophosphor”** Rajni vats, Rachna Ahlawat, International Conference on advances in basic sciences held on 7-9 February 2019 at GDC Memorial College, Bahal, Bhiwani, Haryana India.
4. **“Synthesis and Characterizations of Dy³⁺ doped Y₂O₃:SiO₂ nanopowder”**, International Conference on Recent Researches and Innovations in Sciences, Management, Education and Technology, held at Jan Nayak Ch. Devi Lal Vidyapeeth, Sirsa (Haryana) on 27th-28th March, 2018.
5. **“Synthesis and Characterizations of Dy³⁺: Y₂O₃ Nanopowder Dispersed in Silica Matrix”** International Conference on Advances in Optics and Photonics (ICAOP-2017) held at Department of Physics, GJUS&T Hisar-125001, India, during 23-26 November, 2017.

E. Paper Presented in National Conferences:

1. **“Structural and Optical Investigation of Gd₂O₃:Dy³⁺ Cubic Nanophosphor prepared by Pechini type Sol-Gel Technique”** national conference on Multidisciplinary Approach in Sciences: Present Trends and Future Prospects (NCMAS-2019) held at IB (PG) college Panipat, on 08 November, 2019.
2. **“Structural and Optical Study of Mn doped CdO nanoparticles”**, National Seminar on Nanochemistry held at C.M.K. National P.G. College, Sirsa-125055 (Haryana) India, on January 19, 2018.

F. Paper Presented in Online Conferences:

1. **“Structural and Dye Degradation Study of Cubic Nanocrystalline Yttria”** 5th National Conference on Advanced Materials and Radiation Physics (AMRP-2020) held at Sant Longowal Institute of Engineering and Technology Longowal, Distt. Sangrur-148106 (Punjab), India during 9-11 November, 2020.
2. **“Ln³⁺ doped RE₂O₃: Synthesis, Structural and Optical Characterizations”**, International Conference on Technological Transformation and Preparedness in the Post COVID World held on march 22-23, 2021 at Deen Bandhu Chotu Ram University of Science and Technology, murthal, sonipat (Haryana).
3. **Impact of Single and Double Doping on Morphology and Bandgap of Cubic Yttria**, International Conference on Recent Advances in Basic and Applied Sciences (ICRABAS-2021) held on august 27-28, 2021 at Baba Mastnath University, Rohtak (Haryana).

4. **“Study of Crystallographic Parameters and Thermal Variations in Cubic Y₂O₃ via Lanthanide Doping”**, International e-conference on sustainable and futuristic materials (SFM-2021) held at Department of Chemistry, Kamla Nehru Mahavidyalaya, Nagpur on 29-30, November, 2021.

G. Workshop/ Webinar/ faculty Development programs (FDP):

1. Participated in two week online workshop on **“Comprehensive e-Learning to e-Training guide for Administrative Work”** from May 25 - June 05, 2020, organized by Ramanujan College, Delhi University, Delhi.
2. Participated in One Week online Faculty Development Program on **“Online Teaching & Learning in India”** held on 17th -22nd June 2020, jointly organized by Guru Angad Dev Teaching Learning Centre, SGTB Khalsa College, University of Delhi under the Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNMTT) of MHRD in collaboration with Bodoland University Assam and obtained “A” grade.
3. Participated in One day national Webinar entitled **“ICT Enabled Higher Education in India”** held on 13th July 2020, jointly organized by Guru Angad Dev Teaching Learning Centre, SGTB Khalsa College, University of Delhi under the Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNMTT) of MHRD in collaboration with Sanatan Dharma College, Ambala Cantt. (Haryana)
4. Participated in One Week online Faculty Development Program on **“E-Content Development”** held on 27th -31st July 2020, jointly organized by Guru Angad Dev Teaching Learning Centre, SGTB Khalsa College, University of Delhi under the Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNMTT) of MHRD in collaboration with Sanatan Dharma College, Ambala Cantt. (Haryana) and obtained “A+” grade.
5. Participated in One Week online Faculty Development Program on **“Development of Teacher's e-kit and MOOCs in Four Quadrant Format of e-Content”** held on 12-20 September 2020, organized by Guru Angad Dev Teaching Learning Centre, S.G.T.B. Khalsa College, University of Delhi under the Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNMTT) of MHRD and obtained “A+” grade.

