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Academic Qualifications (All from Pandit Ravishankar Shukla University, Raipur, India)

Degree	Duration	Notification	Subjects	School/ College
PhD †	01/1992-03/1997	01/04/1997	Physics (Solid State Ionics/ Materials Science)	School of Studies in Physics
MPhil ‡	09/1990-08/1991	01/04/1992	Physics (Classical Electrodynamics and Quantum Theory of Radiation, Advanced Quantum Mechanics, Adv. Solid-State Phys.)	School of Studies in Physics
MSc	07/1988-06/1990	23/11/1990	Physics (Math. methods, Classical Mechanics, Quantum Mechanics, Classical Electrodynamics, Statistical Phys., Nuclear Phys., Solid-State Phys., Electronics)	School of Studies in Physics
BSc	07/1985-06/1988	30/06/1988	Physics, Chemistry, Mathematics	Govt. Digvijay Col., Rajnandgaon

† **Thesis Title:** Studies on Electrical Properties and Battery Characteristics of Some Composite Electrolytes

<https://shodhganga.inflibnet.ac.in/handle/10603/43524>

Advisor: Prof. Rakesh Chandra Agrawal (School of Studies in Physics, Pt. R. S. Univ., Raipur), a PhD student of Late Prof. Suresh Chandra, BHU, India

‡ **Dissertation Topic:** Sensitization effect in the photoconductivity of ZnO

Advisor: Prof. Shashi Bhusan (School of Studies in Physics, Pt. R. S. Univ., Raipur).

Employment (28.5 years)

From – To (D/M/Y)	Position	Institution (Department) Place, Country	Nature of Work
01/01/2025–Till Date	Associate Professor	King Saud Univ. (King Abdullah Institute for Nanotechnology) Riyadh, Saudi Arabia	Research: Solid Electrolytes
27/11/2019–31/12/2024	Assistant Professor	King Saud Univ. (King Abdullah Institute for Nanotechnology) Riyadh, Saudi Arabia	Research: Solid Electrolytes
21/04/2011–26/11/2019	Assistant Professor	King Saud Univ. (Optometry) Riyadh, Saudi Arabia	Teaching UG: Optics Research: Solid Electrolytes
01/09/2009–31/01/2011	Postdoctoral Fellow	Sognag Univ. (Chem. & Biomolecular Eng.) Seoul, South Korea	Research: Solar Cells
01/09/2007–31/08/2009	BK-21 Fellow	Yonsei Univ. (Mater. Sci. & Eng.) Seoul, South Korea	Research: SOFC
26/09/2005–31/08/2007	Postdoctoral Fellow	Inha Univ. (Mater. Sci. & Eng.) Incheon, South Korea	Research: SOFC
24/11/2003–31/07/2005	Assistant Professor	Debub Univ. (Applied Physics) Awassa, Ethiopia	Teaching UG: Physics
01/12/2002–20/11/2003	DST Scientist/ Postdoctoral Fellow	Pandit Ravishankar Shukla Univ. (School of Studies in Physics) Raipur, India	Research: Solid Electrolytes Teaching PG: Physics
01/12/2001–30/11/2002	Research Professor	Inha Univ. (Mater. Sci. & Eng.) Incheon, South Korea	Research: Inorganic-organic hybrids, Sol-gel
11/04/2000–31/12/2000	Scientist	Lithium Power Technologies, Inc., Manvel, USA	Research: Batteries
¹ 01/10/1997–30/11/2001	CSIR Research Associate	Pandit Ravishankar Shukla Univ. (School of Studies in Physics) Raipur, India	Research: Solid Electrolytes Teaching PG: Physics
01/02/1997–30/08/1997	Lecturer (Part time)	Raipur Institute of Technology, Raipur, India	Teaching UG: Engg. Phys.

Research Area/ Interest

Solid Electrolytes and Electrodes for Renewable Energy Sources, Batteries, and Supercapacitors; Nano-materials for Energy Application

Conferences/ Workshops/ Seminars Attended: 55 (Invited Talks Delivered 13)

¹ Started the teaching assignment as a lecturer from Aug. '1997, Univ. letter no. 6624/Adm./97 dt. 9/9/1997.

Teaching Statement

Experience

UG Level, 7.2 years; PG Level, 2.25 years. **Total: 9.4 years**

Teaching Area/ Interest

Any Subject of Physics; Solar Cell Device Physics; Renewable Energy; Batteries; Solid-State Electrochemical Devices.

Teaching Philosophy

- My basic educational approach
Being an Indian and having grown up with a healthy “Guru-Shishya Parampara,” the excellent relationship between the student and teacher, I follow the Indian tradition of teaching and interaction with the students. This has been creating a healthy teaching and research atmosphere and resulting in excellent performance by students. I also use the modern teaching aids and introduce the latest trend of the research work to make my students up-to-date.
- How I work with the development of student learning
A student learns very fast if the topic is intriguing and related to his goal. A presentation using pictures, videos, and simulations helps to increase the subject's understanding. Therefore, while preparing a PPT file for a lecture, I use pictures, diagrams, simulations, etc., to explain the subject. I always correlate the topic with the student’s objective.
- How I work with the development of my own learning
Learning is a lifelong process. A teacher or research scholar must engage in self-learning to stay updated with societal and scientific needs. I keep myself updated using literature surveys through the Web of Science/SciFinder. I use Endnote to store the searched data. I also use pdf files for reading.
- How I contribute to the organizational development of my institution
Hiring teachers who excel in both teaching and research can enhance an educational institution. The research helps develop state-of-the-art devices for society and brings funding to the institution. Students acquire new skills and secure employment opportunities with companies. As mentioned earlier, teaching helps a student to learn a topic fast. Because of my teaching capability and energy-based research experience, I will be able to fetch funding easily and produce energy-based skilled students.
- I have knowledge of contemporary teaching practices and experience in testing/assessment, quality assurance, standards for accreditation, e-learning, and curriculum/material design and development.

Developed Course Curriculum

- Statistical Physics and Solid State Physics at the Dept. of Applied Physics, Debu University, Awassa, Ethiopia
- Geometric Optics, Physical Optics, and Clinical Visual Optics as per NCAAA at Dept. of Optometry, College of Applied Medical Sciences, King Saud Univ., Riyadh, Saudi Arabia.

Courses Taught

- 09/2013–05/2019: **Saudi Arabia, Riyadh, King Saud University**, Dept. of Optometry (College of Applied Medical Sciences); Optometry Doctor.
 - **Geometrical Optics (Opto221)**: Geometric methods as applied to refractive and reflecting surfaces, thin and thick lens systems, magnification and prism properties of lenses.
 - **Clinical Visual Optics (Opto223)**: A review of general and physical optics, optical properties of the eye, image quality, schematic and reduced eyes, optics of the cyclopean eye, measurement of parameters of the eye, accommodation, retinal image size, refractive errors, visual axes, Euclidean and non-Euclidean space, Pulfrich phenomenon, spherical ametropia as related to spectacle and relative spectacle magnification, ocular catoptrics and entopic phenomena.
 - **Physical Optics and Photometry (Opto311)**: Principles and clinical applications of apertures and stops, basic photometric concepts, measurement of light levels, applications in ergonomics, diffraction, interference, polarization, birefringence and lasers.
 - **Developed lab experiments including teaching materials for OPTO 221 and OPTO 311**
 - **Research Project (Opto475/Opto498/Opto499)** for the final year students.

- 11/2003–07/2005: **Ethiopia**, Awassa, **Debu University**, Dept. of Applied Physics; Bachelor of Science.
 - **Mechanics and Heat (Phys201)**: Vectors, Kinematics of a particle, Dynamics of a particle, Work and energy, Dynamics of systems of particles, Rigid body motion, Oscillatory motion, Gravitation, Fluid mechanics, Waves, Heat and thermodynamics.
 - **Electricity and Magnetism (Phys202)**: Electric fields, Electric potential, Capacitance and Dielectrics, Electric circuits, Magnetic field, Electromagnetic induction, Magnetic materials, Circuits with varying current, EM waves and Maxwell's equations, Light.
 - **Phys211 (Lab Experiments)** based on Mechanics and Heat.
 - **Statistical Physics (Phys322)**: Review of the laws of thermodynamics, Thermodynamic potentials, Conditions for equilibrium and stability, Legendre transformations, Maxwell relations, Phase transitions, Quantum statistics, System of interacting particles, Kinetic theory of transport processes.
 - **Solid State Physics-I (Phys451)**: Crystal structure, X-ray diffraction, Classification of crystals and binding energy, Thermal properties of solids, Dielectric properties of solids and phase transitions, Dia-, para- and ferro- magnetism.
 - **Solid State Physics-II (Phys452)**: Free electron Fermi gas, Energy bands, Semiconductor crystals, Superconductivity, Point defects
 - **Senior Research Projects (Phys492)** by a 4th year student on a selected topic in physics.
- 08/1997–04/2000 and 08/2003–11/2003: **India**, Raipur, **Pandit Ravi Shankar Shukla University**, School of Studies in Physics; Master of Science.
 - **Solid State Physics**: Crystal structure, X-ray diffraction, Classification of crystals and binding energy, Thermal properties of solids, Dielectric properties of solids and phase transitions, Dia-, para- and ferro- magnetism, Free electron fermi gas, Energy bands, Semiconductor crystals, Point defects.
 - **Electronics**: Energy bands in solids, Transport phenomena in semiconductors, Junction-diode characteristics, Diode circuits, Transistor characteristics, Digital circuits, Transistor at low frequencies, Transistor bias and Thermal stabilization, Transistor at high frequencies, Multistage amplifiers, Feedback amplifiers, Stability and Oscillators, Operational amplifiers.
 - **Laser Physics**: Population inversion, Laser pumping, Resonators - Vibrational modes of resonators, number of modes/unit volume - Open resonators, Control resonators, Q Factor, Losses in the cavity, Threshold condition, Quantum yield; Ruby Laser – three level system, Pumping power, CaF₂ laser, four level laser, Neodymium laser - Nd:YAG; Applications of Lasers in Industry, Medicine & Communication.
 - **Lab Experiments**: Based on Solid State Physics and Electronics.
- 02/1997-08/1997: **India**, Raipur, **Raipur Institute of Technology**, Dept. of Physics; Bachelor of Engineering.
 - **Engineering Physics**: Semiconducting materials, Dielectric materials, Magnetic materials, Superconducting materials.
 - **Lab Experiments**

Research Statement

Experience

MPhil: 1 year; **PhD:** 5.2 years; **Postdoctoral work:** 28.5 years

Research Area/ Interest

Solid Electrolytes and Electrodes for Renewable Energy Sources, Batteries, and Supercapacitors; Nano-particles for Energy Application.

Key Skills

Ionic conductivity, interfacial resistance, capacitance, and dielectric constant by impedance spectroscopy; electrical conductivity by van der Pauw four-probe dc method; ionic mobility by Transient ionic current technique; ionic transference number and ionic drift velocity by dc polarization technique; thermoelectric power by Differential method; structural parameters, such as lattice parameters, volume, bond length, and bond angle using Rietveld analysis of the XRD pattern; structural analysis of the FT-IR and Raman spectra through OPUS software; thermal properties using DTA, DSC, and TGA; thermal expansion using Dilatometry; Brunauer-Emmett-Teller (BET) surface area; pore size and volume by Archimedes' principle; porosity using Pycnometry; Microstructure using SEM; transmittance/ absorption of polymeric film using UV-visible spectrophotometry; battery fabrication and characterizations; compressive strength using Universal Tester; thickness and camber measurements using surface profilometry; dye-sensitized solar cell fabrication and characterizations; Nanosecond laser flash photolysis spectroscopy.

Methods of Preparation

Electrochemical Etching; Solution Casting; UV Curing; Dip and Spin Coating; Sol-Gel Processing (Traditional, Sono Catalysis, Polymeric-Gel, Pechini); Polymeric Sponge; Slurry coating using Myer rod; Tape-casting; Screen-printing; Spray coating; Solid-state methods (Physical mixing, annealing, and melt-quenching); Coating of metal on polymer film by a Thermal-evaporator; Doctor blade.

Designed Sets-up

Sample holder for liquid and solid electrolytes; Sample holder for high temperature electrical conductivity measurement; Electro-phoretic deposition (EPD) set-up; Furnace; Electrochemical etching set-up; Ionic solar cell; Spin-coater; Electrostatic spray deposition unit.

Conferences/ Workshops Participated

1. Workshop on "Solid State Ionics", Banaras Hindu University, Varanasi, **India**, Nov. 2-8, 1992.
2. 3rd Asian Conf. on Solid State Ionics, Varanasi, **India**, Nov. 9-13, 1992. Paper presented: Solid state battery using all halide glassy electrolyte: 0.45AgI: 0.35AgCl: 0.2CsCl.
3. 81st Indian Science Congress, Jaipur, **India**, Jan. 3-8, 1994. Paper presented: Battery discharge characteristics and transference number studies of 0.7[0.75AgI: 0.25AgCl]: 0.3Al₂O₃. (**ISCA-94 Young Scientist Contest**)
4. 1st National Conf. on Solid State Ionics, Amritsar, **India**, Feb. 14-16, 1994. Paper presented: [0.75AgI: 0.25AgCl] quenched system: A better choice as host compound in place of AgI to prepare Ag⁺ ion conducting superionic glasses and composites.
5. 82nd Indian Science Congress, Calcutta, **India**, Jan.3-8, 1995. Paper presented: A new fast Ag⁺ ion conducting composite electrolyte system: Solid state battery and thermoelectric power studies. (**ISCA-95 Young Scientist Contest**)
6. 2nd National Conf. on Solid State Ionics, Madras, **India**, Feb. 15-17, 1996. Paper presented: Transport property studies on some new Ag⁺ ion conducting superionic solids.
7. 5th Asian Conf. on Solid State Ionics, Kandy, **Sri Lanka**, Dec. 2-7, 1996. Paper presented: Thermoelectric power study on a new Ag⁺ ion conducting composite electrolyte system: (1-x)[0.75AgI: 0.25AgCl]: xSnO₂
8. 3rd National Conf. on Solid State Ionics, Itanagar, **India**, March 23-26, 1998. Paper presented: Polarisation/self-depolarization studies on Ag⁺ ion conducting quenched [0.75AgI:0.25AgCl] mixed-system/solid-solution.
9. National Conf. on Science & Technology of Exotic Materials, Bhopal, **India**, June 5-6, 1998. Paper presented: Estimation of mobile ion concentration in Ag⁺ ion conducting AgI by dc polarization/ depolarization studies.
10. 6th Asian Conf. on Solid State Ionics, Suraj Kund, New Delhi, **India**, Nov. 29 - Dec. 4, 1998. Paper presented: Thermoelectric power and battery discharge characteristic studies on a new silver ion conducting composite electrolyte system.
11. WRIC Workshop on "Maintenance of Laboratory Equipment", Pandit Ravishankar Shukla University, Raipur, **India**, Nov. 5-10, 2001.
12. 8th Asian Conf. on Solid State Ionics, Langkawi, **Malaysia**, Dec. 15-19, 2002. Paper presented: Electrical and structural properties of new Li⁺ ion conducting sol-gel derived ormolytes: (SiO₂-PEG)-LiCF₃SO₃.
13. Materials Research Society, Korea, Spring Symp. Jinju, **Korea**, May 19-20, 2006. Paper presented: XRD Analysis of Sol-Gel Derived Novel SOFC Perovskite Cathode: (La_{0.9}Sr_{0.1})(Cr_{0.85}Co_{0.05}Fe_{0.05}Ni_{0.05})O₃ (**Recipient of Best Poster Award**)

14. IUMRS-ICA-2006, Jeju, **Korea**, Sept. 10-14, 2006. Papers presented: (i) Sol-Gel Synthesis and Structural Study on novel IT-SOFC Perovskite Cathode: $(La_{1-x}Sr_x)(Cr_{0.85}Co_{0.05}Fe_{0.05}Ni_{0.05})O_3$ (**Recipient of Best Paper Award**); (ii) Investigation on Electronic Conducting Ceramic Foams as SOFC Current Collectors.
15. 2nd Int. Workshop on “Nanostructured Materials”, Inha University, Incheon, **Korea**, June 15, 2007. **Invited Talk** on “Anionic effect on synthesis of new doped $LaMO_{3-\delta}$ (M = Cr, Mn) perovskites for solid oxide fuel cell applications”.
16. Yonsei University Brain Korea Seminar, Jan. 15, 2008, Seoul, Korea. Paper presented: Phase evolution, structure, oxygen stoichiometry, micro-structure and electrical property of perovskite-type cathodes, $(La_{0.75}Sr_{0.25})(Mn_{0.95-x}M_xNi_{0.05})O_{3+\delta}$, where $x = 0.1 - 0.3$ mole, and M = Fe or Co. (**Recipient of Best Poster Award**)
17. Korea Society of New and Renewable Energy 2008, Daegu, **Korea**, May 22-23, 2008. Paper presented: Structural, micro-structural and electrical properties of perovskite-type cathodes, $(La_{0.75}Sr_{0.25})(Mn_{0.85}M_{0.1}Ni_{0.05})O_{3+\delta}$, M = Fe and Co, for intermediate-temperature solid oxide fuel cell application
18. 18th Int. Conf. on Photochemical Conversion and Storage of Solar Energy (IPS-18), Seoul, **Korea**, July 25~30, 2010. Paper presented: Poly(ethylene oxide): succinonitrile– A new polymeric matrix of solid electrolytes for dye-sensitized solar cells.
19. 1st Int. Conf. on Tap Sun: The Sustainable Future (ICTAPSUN – 2011), ICT, Hyderabad, **India**, November 25-26, 2011. Paper presented: Electrical and photovoltaic properties of blend-based solid polymer electrolytes.
20. Workshop on “Effective Use of Spectroscopy” organized by King Saud University, Riyadh, **Saudi Arabia**, April 4, 2012.
21. 2nd Saudi Association of Optometry Conf. (SAO2013), Riyadh, **Saudi Arabia**, November 25-27, 2013. Paper presented: Contact Lenses – Materials Aspect.
22. 14th Asian Conf. on Solid State Ionics (ACSSI-2014), NUS, **Singapore**, June 24-27, 2014. Paper presented: Electrical, structural, optical and thermal properties of (1-x)blend: $xLi[(CF_3SO_2)_2N]$ solid polymer electrolyte system.
23. 14th Int. Union of Materials Research Societies-Int. Conf. on Advanced Materials (IUMRS-ICAM 2015), Jeju, **Korea**, October 25-29, 2015. Paper presented: Electrical and photovoltaic properties of poly(ethylene oxide)-succinonitrile blend-based redox-couple solid polymer electrolytes.
24. AICTE sponsored online ATAL Faculty Development Program on "Material Modeling for Nano-Electronic Devices", MMNED 2020, Shri Shankaracharya Group of Institutions, Bhilai, **India**, Nov. 2-6, 2020. **Invited talk** on “Solid Polymer Electrolytes for Dye-Sensitized Solar Cells.”
25. Online Short Term Training Program on “Electrochemical Impedance Spectroscopy: Fundamentals and Applications”, National Institute of Technology, Raipur, **India**, Feb 26 - March 3, 2021. **Invited talk** on “Redox Electrolyte Optimization and Dye Sensitized Solar Cell Performance Analysis Using Impedance Spectroscopy.”
26. Int. Webinar at Shri Rawatpura Sarkar Univ., Raipur, India, June 4, 2021. **Invited talk** on “Dye-Sensitized Solar Cells: A Review on Electrolytes”. (Online)
27. 4th Int. Conf. on Science & Engineering of Materials (ICSEM-2021), Sharda University, Greater Noida (UP), **India**, July 19 – 22, 2021. **Invited talk** on “Plastic Crystal-Based Redox Mediators for Dye-Sensitized Solar Cells.” (Hybrid)
28. 14th National Conf. on Solid State Ionics (NCSSI-14), Delhi University, New Delhi, **India**, December 16-18, 2021. Paper presented: Electrical, Structural, Optical, and Thermal Properties of Cobalt-based Redox Mediators, [(1-x) Succinonitrile: xPEO]-LiTFSI-Co(bpy)₃(TFSI)₂-Co(bpy)₃(TFSI)₃. (Hybrid)
29. Int. Conf. on Energy Materials and Devices (ICEMD 2022), Banaras Hindu University, Varanasi, **India**, January 11 & 12, 2022. **Invited talk** on “Cobalt-Based Solid Redox Mediators.” Worked as a member of **Expert Panel** too. (Hybrid)
30. Workshop on Nanostructures for Biomedical Application (NBA-2022), King Saud University, Riyadh, **Saudi Arabia**, February 9, 2022.
31. Int. Conf. on Sustainability: Developments and Innovations (ICSIDI 2022), Prince Sultan University, Riyadh, **Saudi Arabia**, February 19 - 22, 2022. Paper presented: Poly(ethylene oxide)-Succinonitrile Blend-Based Redox Mediators for Solid-State Dye-Sensitized Solar Cells. Worked as a **Session Chair** too. (Hybrid)
32. Int. Conf. on Functional Materials (ICFM-2022), Pt. Ravishankar Shukla University, Raipur, **India**, August 24-26, 2022. **Invited talk** on “A Blend of Poly(Ethylene Oxide) and Tetramethyl Succinonitrile as a Matrix for Solid Polymer Electrolytes”. (Hybrid)
33. 17th Asian Conf. on Solid State Ionics (ACSSI-2022), Nagoya Institute of Technology, Nagoya, **Japan**, Sept. 12-15, 2022. Paper presented: Poly(Ethylene Oxide)-Tetramethyl Succinonitrile Blend as a Matrix for Solid Polymer Electrolytes. (Hybrid)
34. Int. Conf. & Exhibition for Science (ICES2023), King Saud University, Riyadh, **Saudi Arabia**, February 6–8, 2023. Paper presented: Electrical Transport Properties of [Succinonitrile– Poly(Ethylene Oxide)]– LiX– Co(bpy)₃(TFSI)₂– Co(bpy)₃(TFSI)₃ Solid Redox Mediators, Where X = TFSI or Triflate. (Hybrid)
35. Int. workshop on "Experimental and Simulation Solutions for developing Novel Sustainable Materials" (IWESSM-2023), Govt. Nagarjuna PG College of Science, Raipur, **India**, February 7-10, 2023. **Invited talk** on “Solar Cells: Dye-Sensitized Solar Cells—Some Basics.” (Hybrid)
36. 4th Int. Conf. on Condensed Matter & Applied Physics (ICC-2023), Govt. Engineering College, Bikaner, **India**, Oct. 9-10, 2023. Paper presented: Anionic Effect on Electrical Transport Properties of [(1-x)Succinonitrile- xPoly(Ethylene Oxide)]-LiX (X = TFSI or Triflate)-Co(bpy)₃(TFSI)₂-Co(bpy)₃(TFSI)₃ Solid Electrolytes. (Hybrid)

37. 2nd Int. Conf. on Environment and Energy Materials (INCEEM-2023), Sharda University, Greater Noida (UP), **India**, Dec. 6-9, 2023. **Invited talk** on “[$(1-x)$ Succinonitrile: x Poly(Ethylene Oxide)]-Based Solid I^-/I_3^- , Co^{2+}/Co^{3+} , and Cu^+/Cu^{2+} Redox Mediators for Dye-Sensitized Solar Cells.” (Hybrid)
38. 1st Int. Conf. on Advances in Novel Materials: Towards Sustainable Future (ICAN 2024), St. Xavier's College, Ranchi, **India**, Jan. 20-27, 2024. Paper presented: Electrical Transport Properties of Cu^+/Cu^{2+} Solid Redox Mediators for Dye-Sensitized Solar Cell Application. (Hybrid)
39. 2nd Int. Conf. on Sustainability: Developments and Innovations (ICSDI 2024), Prince Sultan University, Riyadh, **Saudi Arabia**, February 18-22, 2024. Paper presented: Sustainable and Ecological Materials: Sodium-Ion Conducting Solid Electrolytes for Solid-State Rechargeable Batteries.
40. 2nd Int. Conf. on Energy Materials and Devices (ICEMD 2024), Banaras Hindu University, Varanasi, **India**, March 19-21, 2024. **Invited talk** on “Solid Redox Mediators for Dye-Sensitized Solar Cells in High-Temperature Regions”. (Hybrid)
41. Int. one-week online faculty development program on “Innovations in High-Performance Materials for Sustainable Energy and Environmental Impacts”, BVRIT Hyderabad College of Engineering for Women, Hyderabad, **India**, April 29 - May 4, 2024. (Hybrid)
42. RSC Desktop Seminar: Americas Emerging Investigators-Energy and Sustainability, Oct. 4, 2024. (Online).
43. King Saud University, Riyadh, **Saudi Arabia**, Nov. 6, 2024. **Invited Talk** on “Solar Cells: An Introduction”. (Hybrid)
44. 2nd Int. Conf. on Recent Trends in Applied Physics & Material Science (RAM 2024), Bikaner, **India**, Nov. 15-16, 2024. Paper presented: Electrical Transport Properties of Solid Cu^+/Cu^{2+} Redox Mediators for Dye-Sensitized Solar Cells. (Hybrid)
45. Workshop on “Principles of Corrosion Testing, Corrosion Prevention and Control” at Center of Excellence for Research in Engineering Materials, King Saud University, Riyadh, **Saudi Arabia**, Nov. 21, 2024.
46. Workshop on “Electrospun Nanofiber Membranes (NFMs): Advanced Biomedical, Environmental, and Energy Applications” at Center of Excellence for Research in Engineering Materials, King Saud University, Riyadh, **Saudi Arabia**, Nov. 28, 2024.
47. Workshop on “Advanced Technologies in Ceramic Coatings for Engineering Applications” at Center of Excellence for Research in Engineering Materials, King Saud University, Riyadh, **Saudi Arabia**, Dec. 19, 2024.
48. Seminar on “Ceramic Nanocomposites: Synthesis and Characterization” at Center of Excellence for Research in Engineering Materials, King Saud University, Riyadh, **Saudi Arabia**, April 29, 2025.
49. Seminar on “High Performance Coatings and their Applications” at Center of Excellence for Research in Engineering Materials, King Saud University, Riyadh, **Saudi Arabia**, May 6, 2025.
50. Seminar on “Ball Milling: Fundamentals, Technologies and Applications” at Center of Excellence for Research in Engineering Materials, King Saud University, Riyadh, **Saudi Arabia**, May 27, 2025.
51. International faculty development program on “Hands-on Training in Computational Materials Science” (Online), Anurag University, Hyderabad, **India**, 23 June–5 July 2025. **Invited Talk** on “Solar Cells–Some Basics”.
52. Seminar on “Succinonitrile-Based Iodide/Triiodide Redox Mediators for Dye-Sensitized Solar Cells” at KAIN, King Saud University, Riyadh, Saudi Arabia on September 24, 2025.
53. National Conference on “Applications of Nanophotonics and Advanced Materials for Instrumentation” (ANAMI-2025), Govt. Dungar College, Bikaner, India, Sept 26-27, 2025. Paper presented: Impedance Spectroscopy Study of Solid Redox Mediators Prepared with Poly(Ethylene Oxide), Succinonitrile, Lithium Perchlorate, and Cobalt Salts for Dye-Sensitized Solar Cells.
54. 5th Int. Conf. on Condensed Matter & Applied Physics (ICC-2025), Bikaner Technical University, Bikaner, **India**, Dec. 12-15, 2025. Paper presented: Photovoltaic Properties of Solid $Co(II/III)$ Redox Mediators [$(1-x)$ Succinonitrile: x PEO]- $Co(bpy)_3(TFSI)_2-Co(bpy)_3(TFSI)_3-LiTFSI$, Where $x = 0, 0.5, \text{ and } 1$ in Weight Fraction. Received the **Best Oral Presentation Award**. (Hybrid)
55. 3rd Int. Conf. on Energy Materials and Devices (ICEMD 2026), Banaras Hindu University, Varanasi, **India**, February 10-12, 2026. **Invited talk** on “Impedance Spectroscopy Study of Solid Cobalt Redox Mediators Prepared with Poly(Ethylene Oxide), Succinonitrile, Cobalt Salts, and Lithium Perchlorate for Dye-Sensitized Solar Cells”. (Hybrid)

List of Publications

(* , Non-ISI Journal/Conference Proceedings)

1. Tertiary phosphane-modified Ni(II) 1,3-Benzothiazol-2-ylacetoneitriledithiolates: Tuning heterogeneous OER electrocatalysis through phosphane denticity, steric modulation, and chelate ring-size variation. D. Omoding, M. R. Jayswal, G. Kociok-Kohn, **R. K. Gupta**, A. Imran, A. Kumar. Journal of Molecular Structure 1356 (2026) 145102. DOI: 10.1016/j.molstruc.2025.145102
2. Metal-to-semiconductor transition and application-driven optical response of TMN armchair nanoribbons. S. K. Nanda, A. Tiwari, V. Singh, M. L. Verma, N. K. Verma, **R. K. Gupta**. Physica E: Low-dimensional Systems and Nanostructures 179 (2026) 116500. DOI: 10.1016/j.physe.2026.116500
3. Camphoric acid and 2,5-bis(pyrid-4-yl)pyridine laden Cd(II)-coordination polymer as reversible turn-off-on sensor for glutamate. J.-J. Zhao, Z. Wang, A. Singh, O. Prakash, A. Imran, **R. K. Gupta**, J.-C. Jin, A. Kumar, Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy 348 (2026) 127219. DOI: 10.1016/j.saa.2025.127219
4. Ultrastable 1,1'-di(3,5-dicarboxylbenzyl)-2,2'-biimidazole based metal-organic framework (MOFs): application in smartphone-assisted ratiometric fluorescent detection of nitrofurazone and trinitrophenol. Y. Wu, X. Bai, J. Xu, L. Hu, Y. Li, M. Shofiullah, U. K. Sharma, A. Imran, **R. K. Gupta**, A. Kumar, Dyes and Pigments 246 (2026) 113399. DOI: 10.1016/j.dyepig.2025.113399
5. Impedance spectroscopy study of solid Co(II/III) redox mediators prepared with poly(ethylene oxide), succinonitrile, cobalt salts, and lithium perchlorate for dye-sensitized solar cells. **R. K. Gupta**, A. Imran, A. Khan, M. A. Shar, K. M. Alotaibi, I. Bedja, A. S. Aldwayyan. Polymers 18 (2026) 142. DOI: 10.3390/polym18010142
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