

Dr Ravindra Kumar Gupta

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Curriculum Vitae

Assistant Professor

Cornea Research Chair, Department of Optometry
College of Applied Medical Sciences, **King Saud University**
P.O. Box 10219, Riyadh 11433, **Saudi Arabia**

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Academic Qualifications

Degree	Duration	Award Date	Subjects	University
PhD [†]	01/1992-04/1997	10/03/1998	Physics (Solid State Ionics)	Pandit Ravishankar Shukla University, Raipur, India
MPhil [#]	09/1990-08/1991	20/05/1992	Physics (Classical Electrodynamics and Quantum Theory of Radiation, Advanced Quantum Mechanics, Advanced Solid-State Physics)	
MSc	07/1988-06/1990	27/05/1991	Physics (Mathematical methods, Classical Mechanics, Quantum Mechanics, Classical Electrodynamics, Statistical Physics, Nuclear Physics, Solid-State Physics, Electronics)	
BSc	07/1985-06/1988	27/03/1989	Physics, Chemistry, Mathematics	

[†] **Thesis Topic:** Studies on Electrical Properties and Battery Characteristics of Some Composite Electrolytes

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

From - To (D/M/Y)	Position	Institution (Department) Place, Country	Nature of Work
22/04/2011- Till date	Assistant Professor	King Saud Univ. (Optometry) Riyadh, Saudi Arabia	Research: Solar Cells Teaching UG: Optics
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	Postdoctoral 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	Debu 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 ¹	Scientist	Lithium Power Technologies, Inc., Manvel, USA	Research: Batteries
01/10/1997- 30/11/2001	CSIR Research Associate ²	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.

Teaching Area/ Interest: Fundamentals of Physics; Engineering Physics; Medical Physics (Geometrical Optics, Physical Optics, Clinical Visual Optics); Solid-State Physics; Electronics; Statistical Physics; Solid-State Chemistry; Solar Cells; Energy Materials. **Experience: 7.83 years**

Research Area/ Interest: Solid Electrolytes and Electrodes for Renewable Energy Sources and Batteries; Nano-materials for Energy Application; Optical properties of Ophthalmic lenses. **Experience: 24.4 years.**

Research Papers Published: 72 (DSSCs, 19; SOFCs, 9; Batteries, 34; Inorganic-organic hybrids & dielectric materials, 10); **No. of ISI Papers: 54**

¹ Special leave from the CSIR, India.

² Started the teaching assignment as a lecturer from Aug. '1997, Univ. letter no. 6624/Adm./97 dt. 9/9/1997.

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Conferences Attended: 18

Workshops Attended: 4 (including an Invited talk)

Research Projects Involved In

- As a Principal Investigator: 3
- **As a Co-Investigator or** Postdoctoral Fellow with Dr. I. M. Bedja, King Saud Univ., Riyadh, Saudi Arabia; Prof. C.M. Whang, Inha Univ., Incheon, Korea; Lithium Power Technologies, Inc., Manvel, USA; Prof. R.C. Agrawal, Pt. R. S. S. Univ., Raipur, India.

Membership of Learned Societies

- Life member, Materials Research Society of India, No. LMB396

Fellowships/ Awards

- Scientist by the Department of Science & Technology (**DST**), New Delhi for the Postdoctoral research work on the Li^+ batteries. (May' 2003–May' 2006)
- Research Associateship by the Council of Scientific & Industrial Research (**CSIR**), New Delhi, India for the Postdoctoral research work on Ag^+ batteries. (From Oct.' 1997–Sept.' 2002: 5 yrs.)
- Project Fellowship by the University Grants Commission (**UGC**), New Delhi, India for the Ph.D. work on composite electrolytes. (Jan.' 1992–Dec. 1995)
- Achieved **Best Poster Award** for paper entitled “XRD Analysis of Sol-Gel Derived Novel SOFC Perovskite Cathode: $(\text{La}_{0.9}\text{Sr}_{0.1})(\text{Cr}_{0.85}\text{Co}_{0.05}\text{Fe}_{0.05}\text{Ni}_{0.05})\text{O}_3$ ”, R.K. Gupta and C.M. Whang, presented at the Mater. Res. Soc., Korea, Spring Symp. May 19-20, 2006, Jinju, Korea.
- Achieved **Best Paper Award** for paper entitled “Sol-Gel Synthesis and Structural Study on novel IT-SOFC Perovskite Cathode: $(\text{La}_{1-x}\text{Sr}_x)(\text{Cr}_{0.85}\text{Co}_{0.05}\text{Fe}_{0.05}\text{Ni}_{0.05})\text{O}_3$ ”, R.K. Gupta and C.M. Whang, presented at the IUMRS-ICA-2006, Sept. 10-14, 2006, Jeju, Korea.

Computer Skill

- Passed Diploma in Computer Programming (Part-time) from the Pandit Ravishankar Shukla University, Raipur, India. Diploma awarded, 10 Nov. 1993
- Well acquainted with Windows-based operating systems.
- Well acquainted with MS Office and various research-based software.

Personal Profile

Sex: Male	Date of Birth: March 23, 1969	Father's Name: Jagannath Prasad Gupta
Nationality: Indian	Marital Status: Married	Wife: Dr Santosh Rani Agrawal
	Daughter: Curie Gupta	Son: Raman Gupta
Home Address: #40, Wadi Mabayid Street, Um Al Hamam, Riyadh 11556, Saudi Arabia.		
Permanent Address: S/o Shri J. P. Gupta, Beauty Palace, Hatari Choak, Chandrapur – 495692, CG, India.		
Phone: +91-9685209331		

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Teaching Statement

Experience

UG Level, 5.58 years; PG Level, 2.25 years. **Total: 7.83 years**

Teaching Area/ Interest

Fundamentals of Physics; Engineering Physics; Medical Physics (Geometrical Optics, Physical Optics, Clinical Visual Optics); Solid-State Physics; Electronics; Statistical Physics; Solid-State Chemistry; Solar Cells; Energy Materials.

Teaching Philosophy

Being an Indian and grown with a healthy “Guru- Shishya Parampara”, the excellent relation 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. I use the modern teaching aids and introduce the latest trend of the research work to make my students up-to-date. This has been resulted in, in general, good performance by students.

- I have knowledge of contemporary teaching practices and experience in testing/ assessment, quality assurance and standards for accreditation such as NCAAA, e-learning, and curriculum/ materials design and development.

Developed Course Curriculum

- Statistical physics and Solid state physics at the Department of Applied Physics, Debub University, Awassa, Ethiopia
- Geometric optics, Physical optics and Clinical visual optics as per NCAAA at Dept. of Optometry, King Saud Univ., Riyadh, Saudi Arabia.

Courses Taught

- **Saudi Arabia, Riyadh: King Saud University**, Dept. of Optometry; Optometry Doctor (4 years OD Course). Duration: 09/2013 – Till date.
 - **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.
- **Ethiopia, Awassa: Debub University**, Dept. of Applied Physics; Bachelor of Science (4 years Degree Course). Duration: 11/2003–07/2005.
 - **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.

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- **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.
- **India, Raipur: Pandit Ravi Shankar Shukla University**, School of Studies in Physics; Master of Science (2 years PG Course). Duration: 08/1997–04/2000 and 08/2003–11/2003
 - **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.
- **India, Raipur: Raipur Institute of Technology**, Dept. of Physics; Bachelor of Engineering (4 years Degree Course). Duration: 02/1997-08/1997
 - **Engineering Physics:** Semiconducting materials, Dielectric materials, Magnetic materials, Superconducting materials.
 - **Lab Experiments**

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Research Statement

Experience

Pre-PhD: 1 year; PhD: 5.17 years; **Postdoctoral**: 18.25 years; **Total**: 24.4 years

Research Area/ Interest

Solid Electrolytes and Electrodes for Renewable Energy Sources and Batteries; Nano-particles for Energy Application; Optical properties of ophthalmic lenses.

Key Skills

Impedance Spectroscopy; Ionic conductivity; Interfacial polarization resistance; van der Pauw four-probe dc method; Electrical conductivity; Transient ionic current technique; Ionic mobility; Ionic transference number; Ionic drift velocity; Differential method; XRD; Rietveld program; Bond length; Bond angle; FT-IR; FT-Raman; Micro-Raman; OPUS; DTA-TGA; DSC; Dilatometry; pH; BET; Surface area; Pore size; Pore volume; Archimedes' principle; Porosity; Pycnometry; SEM-EDS; Microstructure; UV-visible spectrophotometry; Capacitance; dielectric constant; Batteries; Universal Tester; Compressive strength; Photo-cell; Surface profilometry; Camber; Curvature; Stress analysis; Photovoltaic property; IPCE; Nanosecond laser flash photolysis spectroscopy.

Research Projects Involved In

• Principal Investigator/ Scientist

- National plan for science and technology (**NPST**), KSU, Saudi Arabia with Dr Bedja and Dr Khan; Towards all-solid-state dye-sensitized solar cells using Co(II/III) redox couple-based solid polymer electrolytes (Project No. 13-ENE886-2, March' 2013; Two years. (No Funding due to Economic fall)
- Department of Science & Technology (**DST**), New Delhi, India (Fast-track Young Scientist Project); "Li⁺ ion conducting polymer electrolytes batteries"; May' 2003–May' 2006 (Withdrawn).
- Council of Scientific & Industrial Research (**CSIR**), New Delhi, India (Research Associateship Project); Ag⁺-based solid electrolytes for battery application; Oct.'1997–Nov.'2001. (Completed)

• Co-Investigator/ Postdoctoral Fellow

- Dr Bedja (KSU) and Dr Gamal (KSU). Dye-sensitized Solar Cells; Deanship of Scientific Research (**DSR**), KSU, Saudi Arabia. May' 2013–May' 2015. (Completed)
- Dr. I. Bedja, King Saud Univ., Riyadh, Saudi Arabia; Prof. C.M. Whang, Inha Univ., Incheon, Korea; Lithium Power Technologies, Inc., Manvel, USA; Prof. R.C. Agrawal, Pt. R. S. S. Univ., Raipur, India.

Accomplishments

- **Silicon nano-particles** synthesis using electrochemical etching of Si-wafer. We recently showed for the first time that Si-nanoparticles film coated on top of the DSSC works as UV to visible light converter and anti-reflector, and thus improves the cell efficiency. (King Saud Univ., Riyadh)
- **Dye-Sensitized Solar Cells (DSSCs)**: Redox-couple solid polymer electrolytes with electrical conducting ($S_{25^{\circ}\text{C}}$) of $\sim 4\text{--}7 \times 10^{-4} \text{ S cm}^{-1}$ at 25°C were synthesized using poly(ethylene oxide)-succinonitrile blend. The blending largely reduced the poly(ethylene oxide) crystallinity and improved the interfacial contact between dye-sensitized TiO₂ and electrolyte, and thus the cell efficiency. (King Saud Univ, Riyadh; Sogang Univ., Seoul)

We are carrying out various studies on newly synthesized dyes in a group (King Saud Univ, Saudi Arabia; NIMS, Japan; IICT, India).

- **Solid Oxide Fuel Cell (SOFC) Materials** (Inha University, Incheon; Yonsei Univ., Seoul)

Inter-connecting materials: The conventional inter-connecting material, La_{0.8}Sr_{0.2}CrO_{3-d} was synthesized using various solvents and chelating agents in order to remove a commonly observed impurity phase, SrCrO₄. It was shown that the La_{0.8}Sr_{0.2}CrO_{3-d} with the least fraction of SrCrO₄ can be obtained using the ethylene glycol and citric acid (the Pechini method). An impurity-free and highly air sinterable La_{0.8}Sr_{0.2}CrO_{3-d} was synthesized via sintering at $\sim 1200^{\circ}\text{C}$. In order to further improve the electrical conductivity and air sinterability, La_{1-x}Sr_xCrO_{3-d} was partially co-doped with 0.05 mole fraction of Fe²⁺, Co²⁺, and Ni²⁺, respectively. It was also shown

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that the synthesis using the metal acetate precursors by the Pechini method results in a single-phase perovskite; while, the metal nitrate precursors produce secondary phases along with the perovskite phase.

Current collectors: The $\text{La}_{0.8}\text{Sr}_{0.2}\text{CrO}_{3-d}$ coated stainless-steel mesh was developed to reduce the manufacturing cost. $\text{La}_{0.6}\text{Sr}_{0.4}\text{Co}_{0.2}\text{Fe}_{0.8}\text{O}_3$ (LSCF) ceramic foams were also developed with improved mechanical property.

Cathode materials: A conventional perovskite-type cathode system, $\text{La}_{1-x}\text{Sr}_x\text{MnO}_{3+d}$ (LSM) was co-doped with divalent ions, such as Fe^{2+} , Co^{2+} and Ni^{2+} . The co-doping largely improved the ionic conductivity and interfacial polarization resistance of the LSM at the intermediate-temperature range, while retaining the structural, thermal, and micro-structural properties.

Anode/ electrolyte multi-layer: I developed a low cost and in-line lamination procedure using the uni-axial pressing and produced almost flat anode/ electrolyte laminate using the tape-casting method followed by the co-sintering. Electrolyte: YSZ and CGO. Anode: NiO-YSZ and NiO-CGO.

- **Li^+ and Ag^+ ion Conducting Solid Electrolytes for Batteries** (Ravishankar Univ., Raipur; Lithium Power Technol., USA; Inha University, Incheon; Sogang Univ., Seoul)

Fast Ag^+ ion conducting composite and glassy electrolytes with $\sigma_{25^\circ\text{C}}$ of $\sim 10^{-3} \text{ S cm}^{-1}$ were synthesized using new and alternate host-matrix, a quenched/ annealed 0.75AgI: 0.25AgCl mixed-system/ solid-solution. This consequently led to Ag^+ ions-based batteries with improved electrochemical properties. Dispersoids used: Al_2O_3 , SnO_2 , SiO_2 , ZrO_2 and Fe_2O_3 . Glass formers used: $\{\text{B}_2\text{O}_3:\text{MoO}_3\}$, MoO_3 , WO_3 and P_2O_5 .

A methodology was developed to measure the ionic drift velocity and the results were comparable with those determined using the ionic mobility measurement.

Li^+ -ion conducting glasses, $\text{LiI-Li}_2\text{S-B}_2\text{S}_3/\text{P}_2\text{S}_5$ were synthesized using the melt-quenched method. The samples exhibited $\sigma_{25^\circ\text{C}}$ of $\sim 5 \times 10^{-4} \text{ S cm}^{-1}$ at 10 kHz.

Li^+ -ion conducting polymer gel electrolytes were synthesized using commercially-available acrylates and lithium imide salt. The polymeric film was obtained by the Mylar-rod. The cross-linking in polymers was carried using the UV curing. The solvent-free samples exhibited $\sigma_{25^\circ\text{C}}$ of $\sim 3.3 \times 10^{-5} \text{ S cm}^{-1}$ at 10 kHz.

Li^+ -ion conducting organically modified electrolytes (ORMOLYTEs), $(\text{SiO}_2\text{-PEG})\text{-LiCF}_3\text{SO}_3$ were synthesized using the sol-gel method via the classic and sono-catalysis routes. The ORMOLYTE exhibited $\sigma_{25^\circ\text{C}}$ of $\sim 2 \times 10^{-4} \text{ S cm}^{-1}$, which is the highest so far for the ORMOLYTEs.

Nano-particles dispersed Li^+ -ion conducting solid polymer electrolytes with $\sigma_{25^\circ\text{C}}$ of $\sim 5 \times 10^{-4} \text{ S cm}^{-1}$ were synthesized using poly(ethylene oxide)-succinonitrile blend as a host-matrix.

- **Cathodes for Li^+ Rechargeable Batteries** (Lithium Power Technol., USA; Yonsei Univ., Seoul)
Metallized cathode (Al) with conducting graphite, LiCoO_2 and PVDF; $\text{Li}(\text{Ni}_{0.7}\text{Co}_{0.3})\text{O}_2$; LiMn_2O_4 .
- **Photo-conductor:** Rhodamine B dye-sensitized La^{3+} -doped ZnO for improving photo-conductivity of ZnO. (Ravishankar Univ., Raipur)
- **Inorganic-Organic Hybrids:** $\text{SiO}_2\text{-PEG}$ and Cumarin 4 dye doped $\text{SiO}_2\text{-PDMS}$. (Inha Univ., Incheon)
- **Dielectrics:** AgI, AgCl, 0.75AgI: 0.25AgCl, PVDF based Polymers, $\text{Ba}_5\text{Nb}_4\text{O}_{15}$. (Ravishankar Univ., Raipur; Lithium Power Technol., USA; Yonsei Univ., Korea)

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 Li^+ ion transport parameters; Sample holder for high temperature electrical conductivity measurement; Electro-phoretic deposition (EPD) set-up; Furnace; Electrochemical etching set-up.

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Major Equipments Operated

Solartron, HIOKI, and HP impedance analyzers; Graphtec x-y-t recorder; Glove boxes; Thermal-evaporator; High voltage power source; Keithley source meter; FT-IR spectrometers; X-ray diffractometer (Regaku); Ultrasonic processor; Pycnometer; JASCO UV-visible spectrometer; Nikon Polarized Optical microscope; TA Differential Scanning Calorimeter; TA Thermogravimetric Analysis; Tape-caster; Spin coater; Dip coater; IVIVMSTAT Electrochemical Interface coupled with Newport Solar Simulator; I-V and IPCE measurement systems (PV Measurement Inc., USA); Laser flash photolysis spectrometer (LP920).

Workshops Attended (4)

1. Workshop on "Effective Use of Spectroscopy" organized by King Saud University, Riyadh, **Saudi Arabia**, April 4, 2012.
2. **Invited Talk:** 2nd International Workshop on Nanostructured Materials, Inha University, Incheon, **Korea**, June 15, 2007. Anionic effect on synthesis of new doped LaMO_{3-d} ($M = \text{Cr, Mn}$) perovskites for solid oxide fuel cell applications.
3. WRIC Workshop on Maintenance of Laboratory Equipment, Pandit Ravishankar Shukla University, Raipur, **India**, Nov. 5 - 10, 2001.
4. Workshop on Solid State Ionics, Banaras Hindu University, Varanasi, **India**, Nov. 2-13, 1992.

Conferences Participated (18)

1. 3rd Asian Conference on Solid State Ionics, Varanasi, **India**, Nov. 2-13, **1992**. Paper presented: Solid state battery using all halide glassy electrolyte: $0.45\text{AgI} : 0.35\text{AgCl} : 0.2\text{CsCl}$.
2. 81st Indian Science Congress, Jaipur, **India**, Jan. 3-8, 1994. Paper presented: Battery discharge characteristics and transference number studies of $0.7[0.75\text{AgI} : 0.25\text{AgCl}] : 0.3\text{Al}_2\text{O}_3$. (**ISCA-94 Young Scientist Contest**)
3. 1st National Conference on Solid State Ionics, Amritsar, **India**, Feb. 14-16, 1994. Paper presented: $[0.75\text{AgI} : 0.25\text{AgCl}]$ quenched system: A better choice as host compound in place of AgI to prepare Ag^+ ion conducting superionic glasses and composites.
4. 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**)
5. 2nd National Conference on Solid State Ionics, Madras, **India**, Feb. 15-17, 1996. Paper presented: Transport property studies on some new Ag^+ ion conducting superionic solids.
6. 5th Asian Conference on Solid State Ionics, Kandy, **Sri Lanka**, Dec. 2-7, 1996. Papers presented: Thermoelectric power study on a new Ag^+ ion conducting composite electrolyte system: $(1-x)[0.75\text{AgI} : 0.25\text{AgCl}] : x\text{SnO}_2$
7. 3rd National Conference on Solid State Ionics, Itanagar, **India**, March 23-26, 1998. Papers presented: Polarisation/self-depolarization studies on Ag^+ ion conducting quenched $[0.75\text{AgI} : 0.25\text{AgCl}]$ mixed-system/solid-solution.
8. National Conference 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".
9. 6th Asian Conference on Solid State Ionics, Suraj Kund, New Delhi, **India**, Nov. 29 - Dec. 4, 1998. Papers presented: Thermoelectric power and battery discharge characteristic studies on a new silver ion conducting composite electrolyte system.
10. 8th Asian Conference 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: $(\text{SiO}_2\text{-PEG})\text{-LiCF}_3\text{SO}_3$.
11. Materials Research Society, Korea, Spring Symp. Jinju, **Korea**, May 19-20, 2006. Papers presented: XRD Analysis of Sol-Gel Derived Novel SOFC Perovskite Cathode: $(\text{La}_{0.9}\text{Sr}_{0.1})(\text{Cr}_{0.85}\text{Co}_{0.05}\text{Fe}_{0.05}\text{Ni}_{0.05})\text{O}_3$ (**Recipient of Best Poster Award**)
12. IUMRS-ICA-2006, Jeju, **Korea**, Sept. 10-14, 2006. Papers presented: (i) Sol-Gel Synthesis and Structural Study on novel IT-SOFC Perovskite Cathode: $(\text{La}_{1-x}\text{Sr}_x)(\text{Cr}_{0.85}\text{Co}_{0.05}\text{Fe}_{0.05}\text{Ni}_{0.05})\text{O}_3$ (**Recipient of Best Paper Award**); (ii) Investigation on Electronic Conducting Ceramic Foams as SOFC Current Collectors.

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13. 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, $(\text{La}_{0.75}\text{Sr}_{0.25})(\text{Mn}_{0.85}\text{M}_{0.1}\text{Ni}_{0.05})\text{O}_{3+\delta}$, M = Fe and Co, for intermediate-temperature solid oxide fuel cell application
14. 18th International Conference 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.
15. 1st International Conference on Tap Sun: The Sustainable Future (ICTAPSUN – 2011), Hyderabad, **India**, November 25-26, 2011. Paper presented: Electrical and photovoltaic properties of blend-based solid polymer electrolytes.
16. 2nd Saudi Association of Optometry Conference (SAO2013), Riyadh, **Saudi Arabia**, November 25-27, 2013. Paper presented: Contact Lenses – Materials Aspect.
17. 14th Asian Conference on Solid State Ionics (ACSSI-2014), **Singapore**, June 24-27, 2014. Paper presented: Electrical, structural, optical and thermal properties of (1-x)blend: xLi[(CF₃SO₂)₂N] solid polymer electrolyte system.
18. 14th International Union of Materials Research Societies-International Conference 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.

List of Publications

(Total No. of Papers: 72; ISI papers: 54)

In Journals

1. Cationic effect on dye-sensitized solar cell properties using electrochemical impedance and transient absorption spectroscopy techniques, *R. K. Gupta*, I. Bedja, *Journal of Physics D-Applied Physics* 50 (2017) 245501. [Link](#)
2. Heteroleptic Ru(II) cyclometalated complexes derived from benzimidazole-phenyl carbene ligands for dye-sensitized solar cells: an experimental and theoretical approach, T. Jella, M. Srikanth, Y. Soujanya, S. P. Singh, L. Giribabu, A. Islam, L. Han, I. Bedja, *R. K. Gupta*, *Materials Chemistry Frontiers* 1 (2017) 947-957. [Link](#)
3. Effect of different auxiliary ligands and anchoring ligands on neutral thiocyanate-free ruthenium(II) dyes bearing tetrazole chromophores for dye-sensitized solar cells, G. Wu, R. Kaneko, K. Sugawa, A. Islam, I. Bedja, *R. K. Gupta*, L. Han, J. Otsuki, *Dyes and Pigments* 140 (2017) 354-362. [Link](#)
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