

Dr. Ravi Kumar

Department of Physics and Electronics

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Experience:

- ❖ Awarded Ph.D. in Electronics from Kurukshetra University Kurukshetra. (From March 2015 to March 2021).
 - Synthesize, characterization and functionalized of GO via different approaches.
 - Fabrication of functionalized GO based sensor.
 - Teaching assistant.
- ❖ Qualified **UGC-NET** JUNE 2013 in Electronic with a percentile of 68.57 %.
- ❖ Currently working as Assistant Professor in the Department of Electronics, Hansraj College, University of Delhi.
- ❖ Worked as Assistant Professor in Electronics & Communication Department, Chandigarh University.
- ❖ Worked as Assistant Professor in Electronics & Communication Department, Veer Madho Singh Bhandari Uttarakhand Technical University, Dehradun.
 - Member of Examination Cell.
 - Lab In charge of various laboratories
 - Students Mentor
- ❖ Worked as Assistant Professor in Electronics & Communication Department, HCTM Technical Campus, Kurukshetra University.
 - Teaching undergraduate courses.
 - Supervised undergraduate students.
 - Member of purchasing committee and ISO committee.
 - Lab In charge of various laboratories.
- ❖ Worked as a Lecturer in Electronics & Communication Department in Seth Jai Parkash Mukand Lal Institute of Engineering & Technology, affiliated to Kurukshetra University, Haryana.
 - Teaching undergraduate courses.
 - Supervised undergraduate students.
- ❖ Worked as a project trainee in MEMS and Micro sensor Group, CEERI Pilani (from January, 2009 to July, 2009).
- ❖ **Six week** training in embedded system, Netmax Technology, Chandigarh (from July to August, 2005).

Education:

❖ **Ph.D. (2015-2021)**

Department of Electronic Science, Kurukshetra University, Kurukshetra.

Thesis – Functionalization of Graphene Oxide for Gas Sensor Applications.

- Synthesis, controlled Functionalization of graphene, graphene oxide (GO), reduced GO (rGO).
- Fabrication of various gas sensors.
- Teaching assistant for under/post-graduate courses.
- ❖ **Master of Technology (M.Tech.)** in Microelectronics & VLSI Design, Kurukshetra University, Kurukshetra, India (2007-2009).
 - Deposition of TiO₂ thin film by SOL GEL method.
 - Study and fabrication of Acoustic Sensor.
 - Teaching assistant for under-graduate courses.

Motivator and team player:

- ❖ Encouraged under/post-graduate students for completion of their projects/ research work.
- ❖ Training and supervision to users in the cleanroom for fabrication and characterization of devices.

Achievements:

- ❖ Total Teaching and Research experience of more than **Twelve Years**.
- ❖ Qualified the **UGC-NET JUNE 2013** with a percentile of **68.57 %**.
- ❖ Worked as Junior Research Fellow in CSIR Project.
- ❖ Worked as faculty in various reputed Universities like Kurukshetra University, Uttaranchal Technical University & Chandigarh University.
- ❖ Attended various Workshops/FDP/Conferences.
- ❖ Merit of having various papers in peer-reviewed journals (SCI and SCIE) including **Materials Chemistry and Physics (I.F=3.4), Materials Science in Semiconductor Processing (I.F=3.0), Materials Research Express (I.F=1.9), Journal of Material Science: Material in Electronics (I.F=2.1), Journal of Electronic Material (I.F=2.0)**.
- ❖ Successfully completed the course titled “**Workplace communication**” offered by **IIT BombayX** on Dec. 18,2020.
- ❖ Received certificate of completion of Project management course titled “**The Complete Project Management Fundamentals Courses**” on Nov. 4, 2021.
- ❖ Received certificate of completion of “**Agile Crash Course; Agile Project Management; Agile Delivery**” on Nov. 26, 2021.
- ❖ Received certificate of completion of “**Lean Six Sigma Yellow Belt**” on Dec 29, 2021.
- ❖ Received “**AIGPE LEAN SIX SIGMA YELLOW BELT CERTIFICATION**” on Jan 07, 2022.
- ❖ Successfully completed the course titled “**Internet of Things (IoT)-The Mega Course**” offered by **IIT BombayX** on 20 July, 2022.
- ❖ Successfully completed the course titled, “IoT experiments using Arduino UNO and Raspberry Pi” offered by Udemey July 2023.
- ❖ **Presented Paper at National Seminar on Recent Development in Mathematical Sciences and Applications** Organized by Department of Mathematics , Gurugram university Gurugram, Haryana March, 2023.

Journal Publications:

- Monika Mehra, Satish Saini and **Ravi Kumar**, “Performance analysis and comparison of NRZ-DQPSK optical wireless system with different filters under different weather conditions”, *Journal of Optical Communications*, (2023) no 44 : 0279
<https://doi.org/10.1515/joc-2023-0279>
- **Ravi Kumar**, Anil Kumar, Rakesh Singh, Rajesh Kashyap, Rajesh Goel, Dinesh Kumar and Mukesh Kumar, “Investigation of sheet resistance variation with annealing temperature and Development of highly selective room temperature ammonia gas sensor using Functionalized Graphene Oxide,” *Journal of Material Science: Material in Electronics*, 032, no. 2 (2021): 1716-1728 **(I.F = 2.1)**
- **Ravi Kumar**, Rakesh Singh, Anil Kumar, Rajesh Kashyap, Dinesh Kumar, and Mukesh Kumar. "Chemically functionalized graphene oxide thin films for selective ammonia Gas sensing." *Materials Research Express* 7, no. 1 (2020): 015612. **(I.F = 1.9)**
- **Ravi Kumar**, Anil Kumar, Rakesh Singh, Rajesh Kashyap, Rajiv Kumar, Dinesh Kumar, and Mukesh Kumar. "Selective room temperature ammonia gas detection using 2-amino pyridine functionalized graphene oxide." *Materials Science in Semiconductor Processing* 110 (2020): 104920.**(I.F = 3.0)**
- **Ravi Kumar**, Anil Kumar, Rakesh Singh, Rajesh Kashyap, Rajiv Kumar, Dinesh Kumar, and Mukesh Kumar. "Room temperature ammonia gas sensor using ester functionalization of graphene oxide." *Materials Research Express* 6, no. 9 (2019): 095618.**(I.F = 1.9)**
- **Ravi Kumar**, Anil Kumar, Rakesh Singh, Rajiv Kumar, Dinesh Kumar, Satinder Kumar, and Mukesh Kumar. "Room Temperature Ammonia Gas Sensor Using Meta Toluic Acid Functionalized Graphene Oxide." *Materials Chemistry and Physics* (2019): 121922. **(I.F = 3.9)**
- Rakesh Singh, **Ravi Kumar**, Anil Kumar, Dinesh Kumar, and Mukesh Kumar. “Low power and stable resistive switching in graphene oxide based RRAM embedded with ZnO nanoparticles for non volatile memory applications”*Journal of Materials Science: Materials in Electronics* volume 32, pages17545–17557 (2021)
- Rakesh Singh, **Ravi Kumar**, Anil Kumar, Dinesh Kumar, and Mukesh Kumar, “Electroforming free enhanced resistive switching in reduced graphene oxide films embedded with silver nanoparticles for nonvolatile memory applications” *Semiconductor Science and Technology*. 2021 Nov 12;36(12):125019.
- Rakesh Singh, **Ravi Kumar**, Anil Kumar, Dinesh Kumar and Mukesh Kumar,Enhanced Resistive Switching Effect in Ag Nanoparticles Embedded in Graphene Oxide Thin Film, *Journal of Electronic Materials* (2020).**(I.F = 2.0)**.
- Rakesh Singh, **Ravi Kumar**, Anil Kumar, Dinesh Kumar, and Mukesh Kumar. "Enhanced resistive switching in graphene oxide based composite thin film for nonvolatile memory applications." *Materials Research Express* 6, no. 10 (2019): 105621.

- Anil Kumar, Mukesh Kumar, **Ravi Kumar**, Rakesh Singh, B. Prasad and Dinesh Kumar, Numerical model for the chemical adsorption of oxygen and reducing gas Molecules in presence of humidity on the surface of semiconductor metal oxide for gas sensors. applications, *Materials Science in Semiconductor Processing* 90 (2019): 236-244 (I.F = 3.0).
- Anil Kumar, Mukesh Kumar, **Ravi Kumar**, Rakesh Singh, B. Prasad, and Dinesh Kumar. "Numerical model for the chemical adsorption of oxygen and reducing gas molecules in presence of humidity on the surface of semiconductor metal oxide for gas sensors applications." *Materials Science in Semiconductor Processing* 90 (2019): 236-244.
- Anil Kumar, **Ravi Kumar**, Rakesh Kumar, B. Prasad, Dinesh Kumar, and Mukesh Kumar. "Numerical modelling of the potential inside the cylindrical shaped nanocrystallite metal oxide semiconductors and its effect on gas sensor response." *Materials Research Express* 7, no. 4 (2020): 045003.
- Anil Kumar, **Ravi Kumar**, Rakesh Singh, B. Prasad, Dinesh Kumar, and Mukesh Kumar. "Effect of Surface State Density on Oxygen Chemisorption, Grain Potential and Carrier Concentration for Different Grain Sizes of Nanocrystallite Metal Oxide Semiconductors: A Numerical Modelling Approach." Springer journal, *Arab J SciEng* (2020).
- Anil Kumar, Mukesh Kumar, **Ravi Kumar**, Rakesh Singh, B. Prasad, and Dinesh Kumar Biosynthesis of ZnO nanoparticles and effect of silver doping in gas sensing characteristics of volatile organic compounds. *Journal of Coatings Technology and Research*. 2021 Oct 19:1-3.
- Rajesh Kashyap, **Ravi Kumar**, Sarita Devi, Mukesh Kumar, Sachin Tyagi, and Dinesh Kumar Ammonia gas sensing performance of nickel ferrite nanoparticles. *Materials Research Express* 6, no. 12 (2019): 125034. (I.F = 1.9).
- Rajesh Kashyap, **Ravi Kumar**, Mukesh Kumar, Sachin Tyagi, and Dinesh Kumar. "Polyaniline nanofibers based gas sensor for detection of volatile organic compounds at room temperature." *Materials Research Express* 6, no. 11 (2019): 1150d3.

Conference Proceedings

- **Ravi Kumar**, Bhoop Singh, Rakesh Singh, Mukesh Kumar, Dinesh Kumar, "Advancements in Semiconductor Design and Technology: Driving the Future of Electronics" at National Seminar on Recent Development in Mathematical Sciences and Applications Organized by Department of Mathematics, Gurugram university Gurugram, Haryana March, 2023.
- **Ravi Kumar**, Bhoop Singh, Nishant Shankhwar, Rakesh Singh, Mukesh Kumar, Dinesh Kumar, "Synthesis of Reduced Graphene Oxide from Graphene Oxide for Device Applications", HRC Journal of Contemporary Science, Volume 01: Issue 01, September 2023
- Rakesh Singh, **Ravi Kumar**, Anil Kumar, Rajesh Kashyap, Mukesh Kumar, and Dinesh Kumar. "Bipolar resistive switching in graphene oxide based metal insulator metal structure for non-volatile memory applications." In *AIP Conference Proceedings*, vol. 1953, no. 1, p. 050053. AIP Publishing, 2018.

- **Ravi Kumar**, Mukesh Kumar, Anil Kumar, Rakesh Singh, Rajesh Kashyap, Sumita Rani, and Dinesh Kumar. "Surface modification of Graphene Oxide using Esterification." *Materials Today: Proceedings* 18 (2019): 1556-1561
- Anil Kumar, Mukesh Kumar, Ravi Kumar, Rakesh Singh, B. Prasad, and Dinesh Kumar. "Numerical modelling of Chemisorption of oxygen gas molecules on the surface of semiconductor for gas sensors applications." *Materials Today: Proceedings* 18 (2019): 1272-1279.
- **Ravi Kumar**, Rakesh Singh, Anil Kumar, Rajesh Kashyap, Mukesh Kumar, and Dinesh Kumar. "Study the thermal stability of functionalized graphene oxide." In *AIP Conference Proceedings*, vol. 2142, no. 1, p. 040015. AIP Publishing, 2019.
- Anil Kumar, Mukesh Kumar, **Ravi Kumar**, Rakesh Singh, B. Prasad, and Dinesh Kumar. "Gas sensitivity as a function of nano sized crystallite in metal oxide semiconductor based gas sensors." *Materials Today: Proceedings* 17 (2019): 161-167.
- Anil Kumar, **Ravi Kumar**, Rakesh Singh, B. Prasad, Dinesh Kumar, and Mukesh Kumar "Relationship of the electric potential inside the nano crystallite with the chemisorbed gas molecules at metal oxide semiconductor surface and its effect on gas sensor response," *IOP Conf. Ser. Mater. Sci. Eng.*, vol. 804, p. 12048, Jun. 2020.
- **Rakesh Singh**, **Ravi Kumar**, Anil Kumar, Dinesh Kumar and Mukesh Kumar "Reduction in Switching Voltage of GO based RRAM for Non-volatile memory applications", on 8 th International Symposium on Fusion of Science & Technology (ISFT-2020), 320-325, ISBN: 978-93-5396-516-7
- **Ravi Kumar**, Anil Kumar, Rakesh Singh, Rajesh Kashyap, Dinesh Kumar, and Mukesh Kumar, "Thin film deposition of Functionalized Graphene Oxide for Sensor applications", International Symposium on Fusion of Science & Technology (ISFT-2020), 320-325, ISBN: 978-93-5396-516-7.

Fabrication and Characterization Techniques Hands-On

- Thorough knowledge of operation and maintenance of clean workbenches (class 1000) and clean rooms (class 10000).
- Spin Coating.
- Wafer cleaning: Piranha, RCA (SC1 & SC2), Rinse & dryer.
- Three zone Oxidation/Diffusion Furnaces from M/s Tempress, General signal.
- Four Probe Resistance meter (Model DFP-02) M/s Scientific Equipment System.
- Wet Isotropic Etching, Vapor HF Etching
- Reactive Ion Etching (RIE)
- Thin Film Deposition [Thermal Evaporation System (Model No: 12A4D) M/s HindHivac Vacuum System]
- Ellipsometry (GAERTNER Scientific Corporation).
- Resistivity measurement (Four probe)
- AFM
- XRD
- Surface Profilometer

- DC Sputtering machine

Trainings/Workshops Attended:

Details: National Seminar on Recent Development in Mathematical Sciences and Applications

Organization: Department of Mathematics, Gurugram university Gurugram, Haryana March, 2023.

Details: IEEE One Week Faculty Development Programme on “Wireless Communication Networks and its Applications”

Duration: 25 to 29 November 2023

Organization: Department of Electronics and Telecommunication Engineering, Yashwantrao Chavan College of Engineering, Nagpur and Technically Sponsored by IEEE Nagpur Subsection.

Details : IEEE Two Days Workshop on “Design of Wireless Networks using Network Simulator 2

Duration: 18 to 19 Aug. 2023

Organization: Department of Electronics and Telecommunication Engineering, Yashwantrao Chavan College of Engineering, Nagpur and Technically Sponsored by IEEE Nagpur Subsection.

Details: Completed One Professional Development Hour on Anomalous mechanical impact on reliability of physically conformal CMOS electronics Professor Muhammad Hussain, Fellow IEEE Electrical and Computer Engineering, Electrical And Computer Eng, Purdue University, Elmore Family School of Electrical and Computer Engineering, West Lafayette, Indiana

Duration: One hour, April 08, 2023

Organization: IEEE Electron Device Society (EDS)

Details: Two Professional Development Hour by on Transistor technologies beyond Si CMOS Professor Mikael Östling, Fellow IEEE, KTH Royal Institute of Technology & Reliability of Metal Gate / High-K CMOS devices Andreas Kerber, IEEE Senior Member and at Intel in Santa Clara, CA.

Duration: Two Hours, April 03, 2023

Organization: IEEE Electron Device Society (EDS)

Details: Online webinar on Horizons of High-Energy Physics

Duration: 7th January 2023

Organization: Department of Physics and Electronics in collaboration with Research and Development Cell and Internal Quality Assurance Cell.

Details: One Week (Online) Faculty Development Programme on Machine learning and Deep learning using python

Duration: 2nd Aug. to 6 Aug. 2022

Organization: MET institute of computer science

Details: One Week (Online) Faculty Development Programme on “MOOCs AND E-CONTENT DEVELOPMENT”

Duration: 23rd November– 29th November, 2022

Organization: Shivaji College, University of Delhi in association with Mahatma Hansraj Faculty Development Centre, Hansraj College, University of Delhi

Details: One Month “Faculty Induction Programme” (Blended Mode)

Duration: 1st December – 30th December, 2022

Organization: Mahatma Hansraj Faculty Development Centre Hansraj College, University of Delhi

Details: Short Term Course on VLSI Design Tools

Duration: Five Days **June 27, 2022 to July 02, 2022**

Organization: Lovely Professional University.

Details: International conference on International conference on Advanced Materials, Energy & Environmental Sustainability, ICAMEES 2018.

Duration: Two Days, 14th – 15th December, 2018

Organization: Department of Chemistry and Physics, UPES, Dehradun, India,

Details: 6th National Conference on Nanoscience and Instrumentation Technology

Duration: Two Days, 29th – 30th March, 2018

Organization: NIT, Kurukshetra, India.

Details: International Conference on Nanotechnology: Ideas, Innovations and Initiatives, 2017.

Duration: Three Days, 6-8 December, 2017

Organization: Indian Institute of Technology, Roorkee, India

Details: One Week Inter-Disciplinary Faculty Development Program on Nanoscience and Nanotechnology.

Duration: One Week, 6-11 March, 2017

Organization: Kurukshetra University, Kurukshetra, India

Details: Sawarn Jayanti Workshop on VLSI design and image processing.

Duration: Two Days, 3-4 February, 2017

Organization: Kurukshetra University, Kurukshetra, India

Details: Swarn Jayanti Faculty Development Program on Sensors and Instrumentation Technology.

Duration: One Week, March 20-25, 2017

Organization: Department of Instrumentation, Kurukshetra University, Kurukshetra, India

Details: Familiarization Workshop on Nanofabrication Technologies.

Duration: Three Days, 16-18 December, 2015

Organization: Indian Institute of Technology, Bombay, India

Details: Workshop on Simulation Tools for Nanostructures and Device Modeling

Duration: One Days, 21 March, 2015

Organization: NIT, Kurukshetra, India

Details: Workshop on MEMS and its Application

Duration: Three Days, 12-14 November, 2010

Organization: Electronics Science Department, Kurukshetra University, India

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