




Title	First Name	Last Name	Photograph
Designation			
Address	Department of Physics, Acharya Narendra Dev College, (University of Delhi) Govindpuri, Kalkaji, New Delhi 110019		
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Residence	Ground Floor, Gali No. 1-A/8, Wazirabad, Delhi-110084, India		
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Educational Qualifications			
Degree	Institution	Year	
B.Sc.	V.B.S. Purvanchal University, Jaunpur	2004	
M.Sc. (Physics)	V.B.S. Purvanchal University, Jaunpur	2008	
M.Phil. (Nanotechnology)	Bundelkhand University, Jhansi	2011	
Ph.D.	Babasaheb Bhimrao Ambedkar University, Lucknow	2016	
Career Profile			
<ul style="list-style-type: none"> ➤ Assistant Professor (PHYSICS) since 18 January 2019 to till date Department of Physics, Acharya Narendra Dev College, (University of Delhi) Govindpuri, Kalkaji, New Delhi 110019 ➤ Post PhD. Research Experience: 2 YEARS Post-Doctoral FELLOW (DST-SERB) - February, 2017 to January 2019 Department of Physics and Astrophysics, University of Delh, MENTOR: PROF. VINAY GUPTA Pay Scale: 55,000/- Post-Doctoral Research on Fabrication and investigation of CNT doped hexaferrite thin film as sensor application 			
Administrative Assignments			
Areas of Interest / Specialization			
<ul style="list-style-type: none"> Materials Science ➤ Materials Characterization ➤ Thin Films 			

➤ Polymer Science

➤ Nanocomposites

Expertise in Synthesis / Characterization Techniques/Applications

I. Synthesis of nanoparticles /nanocomposites

- ✚ Sputtering Technique
- ✚ Chemical Vapor Deposition Process
- ✚ Chemical Bath Deposition Process
- ✚ Sol-Gel Process
- ✚ In-situ Polymerization
- ✚ Solution Intercalation
- ✚ Thin film deposition by thermal evaporation technique
- ✚ Thin film deposition by Spin coating technique
- ✚ Thin film deposition by Dip coating technique
- ✚ Synthesis of materials by chemical reaction
- ✚ Synthesis of material by using melts method

II. Characterization Techniques

- ✚ Powder X-ray diffractometry analysis
- ✚ UV-Visible Spectrophotometer analysis.
- ✚ Photoluminescence (PL) analysis
- ✚ Raman spectroscopy analysis
- ✚ FTIR spectroscopy analysis
- ✚ Scanning electron microscopy (SEM)
- ✚ Impedance analysis
- ✚ I-V characteristic analysis
- ✚ Spin coating

III. Applications

- ✚ Gas Sensor
- ✚ Optical Sensor
- ✚ Electrical Sensor
- ✚ Solar Cell
- ✚ Energy Harvesting

Subjects Taught

- Electricity and Magnetism
- Applied Optics

Research Guidance

Publications Profile

29. **Rakesh Kumar Sonker**, B.C. Yadav, Vinay Gupta, Monika Tomar, Synthesis of CdS nanoparticle by sol-gel method as low temperature NO₂ sensor, **Materials Chemistry and Physics** 239 (2020) 121975.

28. **Rakesh Kumar Sonker**, B.C. Yadav, Vinay Gupta, Monika Tomar, Fabrication and characterization of ZnO-TiO₂-PANI (ZTP) micro/nanoballs for the detection of flammable and toxic gases, **Journal of Hazardous Materials**, 370 (2019) 126-137.

27. T. Vimal, K. Agrahari, **Rakesh Kumar Sonker**, R. Manohar, Investigation of thermodynamical, dielectric and electro-optical parameters of nematic liquid crystal doped with polyaniline and silver nanoparticles, **Journal of Molecular Liquids**, 290 (2019) 111241.

26. S. Sikarwar, B.C. Yadav, **Rakesh Kumar Sonker**, G.I. Dzhardimalieva, J.K. Rajput, Synthesis and characterization of highly porous hexagonal shaped CeO₂-Gd₂O₃-CoO nanocomposite and its opto-electronic humidity sensing, **Applied Surface Science**, 479 (2019) 326-33.

25. K.K. Halder, **Rakesh Kumar Sonker**, V.K. Sachdev, Monika Tomar, Vinay Gupta, Study of electrical, dielectric and EMI shielding behavior of copper metal, copper ferrite and PVDF composite, **Integrated Ferroelectrics**, 194 (2018) 78-85.

24. **Rakesh Kumar Sonker**, S. Sikarwar, S.R. Sabhajeet, Rahul, B.C. Yadav, Spherical growth of nanostructures ZnO based optical sensing and photovoltaic application, **Optical Materials**, 83 (2018) 342-347.

23. S. Sikarwar, **Rakesh Kumar Sonker**, A. Shukla, B.C. Yadav, Synthesis and investigation of cubical shaped barium titanate and its application as opto-electronic humidity sensor, **J. Mater. Sci: Mater Electron.**, 29 (2018) 12951-12958.

22. Rahul, P.K. Singh, M. Parvaz, S. Ahmed, **Rakesh Kumar Sonker**, B. Bhattacharya, et al., Less toxic tin incorporated perovskite solar cell using polymer electrolyte processed in the air, **Optik**, 169 (2018) 166-171.
21. S. Sabhajeet, B. Yadav, **Rakesh Kumar Sonker**, Sol-gel formed spherical nanostructured titania based liquefied petroleum gas sensor, **AIP Conference Proceedings**, 1953 (2018) 030078.
20. **Rakesh Kumar Sonker**, Rahul, S.R. Sabhajeet, ZnO nanoneedle structure based dye-sensitized solar cell utilizing solid polymer electrolyte, **Materials Letters**, 223 (2018) 133-136.
19. **Rakesh Kumar Sonker**, S.R. Sabhajeet, B.C. Yadav, Rahul Johari, LPG detection using SnO₂, PANI-SnO₂ and Ag-SnO₂ composite film fabricated by Chemical route, **Int. J. Electroactive Mater.** 5 (2017) 6-12.
18. **Rakesh Kumar Sonker**, S.R. Sabhajeet, B. C. Yadav, Preparation of PANI doped TiO₂ nanocomposite thin film and its relevance as room temperature liquefied petroleum gas sensor, **J. Mater. Sci: Mater Electron.**, 28 (2017) 14471–14475.
17. **Rakesh Kumar Sonker**, B. C. Yadav, Development of Fe₂O₃-PANI nanocomposite thin film based sensor for NO₂ detection, **J. Taiwan Ins. of Chemical Eng.**, 77 (2017) 276-281.
16. M. Singh, B.C. Yadav, A. Ranjan, **Rakesh Kumar Sonker**, M. Kaur, Detection of liquefied petroleum gas below lowest explosion limit (LEL) using nanostructured hexagonal strontium ferrite thin film, **Sens. Act. B: Chemi.** 249 (2017) 96-104.
15. B.C. Yadav, K. S. Chauhan, S. Singh, **Rakesh Kumar Sonker**, S. Sikarwar and R. Kumar, Growth and characterization of sol-gel processed rectangular shaped nanostructured ferric oxide thin film followed by humidity and gas sensing, **J. Mater. Sci: Mater Electron.**, 28 (2017) 5270-5280.
14. Chandkiram Gautam, Chandra Shaker Tiwary, Sujin Jose, Sehmus Ozden, Santosh kumar Biradar, B. C. Yadav, **Rakesh Kumar Sonker**, P.M. Ajayan, Synthesis of Porous h-BN 3 D Architectures for Humidity and Natural Gas Sensing Applications, **RSC Advances**, 6 (2016) 87888-87896.
13. **Rakesh Kumar Sonker**, B. C. Yadav, G. I. Dzhardimalieva, Preparation and properties of nanostructured PANI thin film and its application as low temperature NO₂ sensor, **J. Inorg. Organomet. Polym.**, 26 (2016) 1428-1433.

12. **Rakesh Kumar Sonker**, Monika Singh, Utkarsh Kumar and B. C. Yadav, MWCNT doped ZnO nanocomposite thin film as LPG sensing, **J. Inorg. Organomet. Polym.**, 26 (2016) 1434-1440.
11. **Rakesh Kumar Sonker**, B.C. Yadav, Synthesis of ZnO/CNTS nanocomposite thin film and its sensing, **Int. Jour. on Applied Bioengineering**, 10 (2016) 7-11.
10. **Rakesh Kumar Sonker**, S.R. Sabhajeet, B.C. Yadav, TiO₂-PANI nanocomposite thin film prepared by spin coating technique working as room temperature CO₂ gas sensing, **J. Mater. Sci: Mater Electron.**, 27 (2016) 11726-11732.
9. Utkarsh Kumar, Samiksha Sikarwar, **Rakesh Kumar Sonker**, B.C. Yadav, Carbon Nanotube: Synthesis and Application in Solar Cell, **J. Inorg. Organomet. Polym.**, 26 (2016) 1231-1242.
8. **Rakesh Kumar Sonker**, B.C. Yadav, Anjali Sharma, Monika Tomar, Vinay Gupta, Experimental investigations on NO₂ sensing of Pure ZnO and PANI-ZnO composite thin films, **RSC Advances**, 6 (2016) 56149-56158.
7. **Rakesh Kumar Sonker**, B.C. Yadav, Low temperature study of nanostructured Fe₂O₃ thin films as NO₂ sensor, **Materials Today: Proceedings**, 3 (2016) 2315-2320.
6. **Rakesh Kumar Sonker**, B.C. Yadav, Growth mechanism of hexagonal ZnO nanocrystals and their sensing application, **Materials Letters**, 160 (2015) 581-584.
5. **Rakesh Kumar Sonker**, S.R. Sabhajeet, Satyendra Singh, B.C. Yadav, Synthesis of ZnO nanopetals and its application as NO₂ gas sensor, **Materials Letters**, 152 (2015) 189-191.
4. **Rakesh Kumar Sonker**, Anjali Sharma, Monika Tomar, Vinay Gupta, B.C. Yadav, Nanocatalyst (Pt, Ag and CuO) Doped SnO₂ Thin Film Based Sensors for Low Temperature Detection of NO₂ Gas, **Adv. Sci. Lett.**, 20 (2014) 1374-1377.
3. **Rakesh Kumar Sonker**, B.C. Yadav, Chemical Route Deposited SnO₂, SnO₂-Pt and SnO₂-Pd Thin Films for LPG Detection, **Adv. Sci. Lett.**, 20 (2014) 1023-1027.

2. **Rakesh Kumar Sonker**, Anjali Sharma, Monika Tomar, Vinay Gupta, B.C. Yadav, Low Temperature Operated NO₂ Gas Sensor Based on SnO₂-ZnO Nanocomposite Thin Film, **Adv. Sci. Lett.**, 20 (2014) 911-916.

1. **Rakesh Kumar Sonker**, Anjali Sharma, Md. Shahabuddin, Monika Tomar, Vinay Gupta, Low temperature sensing of NO₂ gas using SnO₂-ZnO nanocomposite sensor, **Adv. Mat. Lett.**, 4 (2013) 196-201.

Conference/ Presentations/Workshops

32. International Conference on Science and Engineering of Materials "ICSEM-2018" 6-8th January 2018, Sharda University, Greater Noida, India, entitled of oral presentation **Gelation Synthesis of SnO₂ nanoparticle-based NO₂ sensors with high response.**

31. 2nd International Conference on Modern Mathematical Methods and High Performance Computing in Science and Technology "M3HPCST 2018" 4-6th January 2018, Inderprastha Engineering College, Ghaziabad, entitled of oral presentation **Theoretical and experimental investigation on structural stability, electronic and vibrational properties of Polyaniline (PANI).**

30. 6th International Symposium on Integrated Functionalities "ICTF-2017" 10-13th December 2017, Shangri-La Eros Hotel, Delhi, India, entitled of poster presentation **Neem Leaf Extract Synthesis of the Fe₂O₃ Nanoparticles and application.**

29. 2nd International Conference on Condensed Matter and Applied Physics "ICC-2017" 24-25th November, 2017 Bikaner, India, entitled of poster presentation **Sol-gel formed spherical nanostructured Titania based Liquefied Petroleum Gas Sensor.**

28. International Conference on Thin Films "ICTF-2017" 14-17th November, 2017, CSIR-National Physical Laboratory, New Delhi, India, entitled of poster presentation **Preparation of CdS nanoparticle by sol-gel method as low temperature NO₂ sensor.**

27. International Conference of Nanoscience & Nanotechnology "ICNN 2017" 18-20 November 2017, BBAU Lucknow entitled of the Young Researcher oral presentation **Azadirachta Indica Leaf Extract Synthesis of the Fe₂O₃ Nanoparticles.**

26. International Conference on Energy Environment and Engineering "ICEEE-2016" Feb. 29, March 1 and 2, 2016, Coimbatore Institute of Technology, Tamilnadu, entitled of the presentation **PANI doped TiO₂ composite nanoparticles employed as room temperature Liquefied Petroleum Gas sensor.**
25. International Conference on Energy Environment and Engineering "ICEEE-2016" Feb. 29, March 1 and 2, 2016, Coimbatore Institute of Technology, Tamilnadu, entitled of the presentation **Synthesis of CdS nanoparticle by sol-gel method as low temperature NO₂ sensor.**
24. International Conference on Plasma Science, Technology & Application, 20-21 January 2016, Lucknow, entitled of the presentation **Nanostructure TiO₂ thin film prepared by sol-gel method as low temperature NO₂ sensor.**
23. 3rd Lucknow Science Congress and National Conference on "Science For Society: An Interdisciplinary Approach" held in 31st October- 2nd November 2015, BBAU, Lucknow, entitled of the presentation **Enhanced response for NO₂ Gas Sensor made of WO₃ Doped SnO₂ Nanostructured thin film.**
22. International Conference on Recent Advances in Nano Science and Technology "RAINSAT-2015" 8-10th July, 2015, Sathyabama University Chennai, entitled of the oral presentation **Low temperature study of nanostructured Fe₂O₃ thin films as NO₂ sensor.**
21. International Conference on Euro Intelligent Materials 2015, 10-12 June 2015, Kiel Germany, entitled of the oral presentation **Fabrication of ZnO/MWCNTs nanocomposite thin film and its NO₂ sensing.**
20. National Seminar on Recent Advances in Physics "NSRAP-2015" 16th February 2015, Department of Applied Physics, Delhi Technological University, Delhi.
19. International Workshop Bridging Development Divide for Inclusive Growth through Science, Technology and Innovation "BRIDGES-2015" 16-17 January 2015, BBAU, Lucknow, entitled of the poster presentation **Morphology Dependent synthesis of SnO₂ thin films and their characterization for NO₂ gas sensing application.**
18. National conference on Emerging Trends in Nanoscience and Nanotechnology 23-24 December 2014, MVP Samaj's Arts, Science and Commerce College, Ozar, Nashik entitled of the oral presentation **Chemical route synthesis of ZnO nanoflower and its application as NO₂ sensor.**
17. 3rd International Conference on Nanotechnology "NANOCON-2014" 14-15 October 2014, Bharti Vidyapeeth University, Pune entitled of the oral presentation **NO₂ sensing Properties of PANI-ZnO hybrid composite thin film.**

16. 2nd International Conference, Kathmandu Symposia On Advanced Material-2014 (**KASAM-2014**), September 7-10, 2014, Tribhuvan University of Nepal, **NEPAL** entitled of the presentation **Synthesis and characterization Fe-doped TiO₂ by Sol-Gel method for LPG Sensor using precursor TiCl₄ at Room Temperature.**
15. 2nd International Conference, Kathmandu Symposia On Advanced Material-2014 (**KASAM-2014**), September 7-10, 2014, **NEPAL** entitled of the presentation **LPG detection for SnO₂, PANI-SnO₂ and Ag-SnO₂ composite film fabricated by Chemical route method.**
14. International Symposium on Advances in Materials Characterization (**ISAMC-2014**) **BB Ambedkar University, Lucknow July 14, 2014, India** entitled of the presentation **Study of NO₂ Sensing metal oxide (SnO₂) thin film.**
13. 2nd National Conference on **Multifunctional Advanced Materials, Shoolini University, Solan, H. P. June 11-13, 2014, India** entitled of the presentation **PANI/Ni doped SnO₂ thin film based novel NO₂ gas sensor.**
12. National Conference on Nanotechnology and Renewable Energy "**NCNRE- 2014**" 28-29 April 2014, **Jamia Millia Islamia New Delhi** entitled of the presentation **Nanocatalyst (Pt, Ag and CuO) doped SnO₂ thin films for low temperature detection NO₂ gas.**
11. National Conference on Nanotechnology and Renewable Energy "**NCNRE- 2014**" 28-29 April 2014, **Jamia Millia Islamia New Delhi** entitled of the presentation **A review on counter electrode materials as TiO₂ film in Dye Sensitized Solar Cells.**
10. National Conference on Nanotechnology and Renewable Energy "**NCNRE- 2014**" 28-29 April 2014, **Jamia Millia Islamia New Delhi** entitled of the presentation **Effect of Polyaniline/ Titanium dioxide composite film for LPG sensing.**
9. National Conference on Nanotechnology and Renewable Energy "**NCNRE- 2014**" 28-29 April 2014, **Jamia Millia Islamia New Delhi** entitled of the presentation **Temperature and Orientation Dependent Ultrasonic Properties of AlN.**
8. 2st LUCKNOW SCIENCE CONGRESS "**LUSCON-2014**" held in **MARCH 27-28, 2014, BBAU, Lucknow,** entitled of the presentation **Synthesis of Nanocrystalline Tin oxide in Polyaniline Matrix and its Application as NO₂ Gas Sensor.**

7. International Union of Materials Research Society – ICA “IUMRS-ICA 2013” 16-20 December 2013, IISC Bangalore entitled of the presentation **ZnO-SnO₂ nanocrystalline composite structure for efficient low temperature detection of NO₂ gas (02-OP-07).**

6. International Conference of Nanoscience & Nanotechnology “ICNN 2013” 18-20 November 2013, BBAU Lucknow entitled of the presentation **Low temperature operated NO₂ gas sensor based on SnO₂-ZnO nanocomposite thin film (PP-255).**

5. International Conference of Nanoscience & Nanotechnology “ICNN 2013” 18-20 November 2013, BBAU Lucknow entitled of the presentation **Efficient room temperature detection of NO₂ gas using a novel sensor structure based on SnO₂-PANI composite (PP-120).**

4. Poster Presentation in National Seminar on Frontiers of Condence Matter Physics, organised by Department of Physics & Astrophysics, **University of Delhi. April 12 – 14, 2013** entitled of the presentation **Zinc Oxide and Tin Oxide Nanocrystalline thin Film for Low Temperature Operated NO₂ Gas Sensor.**

3. 1st LUCKNOW SCIENCE CONGRESS “LUSCON-2013” held in **MARCH 20-21, 2013, BBAU, Lucknow,** entitled of the presentation **Zinc Oxide and Tin Oxide Nanocrystalline Composites for Low Temperature Operated NO₂ Gas Sensor.**

2. ICNANO-2011 held in 18-21 December, 2011, University of Delhi, entitled of the presentation, **Low temperature sensing of NO₂ gas using SnO₂-ZnO nanocomposite sensor.**

1. National Conference on Ultrasonic “NCU 2011” 25-26 March 2011, **Bundelkhand University Jhansi (India).**

Research Projects (Major Grants/Research Collaboration)

Awards and Distinctions

1. **Elsevier, Optik: International Journal for Light and Electron Optics Award,** Outstanding Reviewer, awarded August, 2018
2. **Elsevier, Materials Letters Award,** Outstanding Reviewer, awarded June, 2017
3. **National Post-Doctoral Fellowship (NPDF) by SERB-DST, India (2017).**

4. **Travel Grant Award-2015 from Science & Engineering Research Board (SERB)**, Government of India, Delhi for visiting **University of Kiel, Germany**.
5. **Young Research Award**, Rakesh Kumar Sonker in International Conference on Recent Advances in Nano Science and Technology **“RAINSAT-2015”** 8-10th July, 2015, Sathyabama University, Chennai, entitled of the oral presentation, **“Synthesis of ZnO/CNTs nanocomposite thin film and its sensing”**
6. **Best Poster Award**, Rakesh Kumar Sonker, Anjali Sharma, Monika Tomar, Balchandra Yadav, Vinay Gupta in 1st LUCKNOW SCIENCE CONGRESS held in MARCH 20-21, 2013, BBAU, Lucknow, entitled of the presentation **“Zinc Oxide and Tin Oxide Nanocrystalline Composites for Low Temperature Operated NO₂ Gas Sensor”**
7. **University Merit Award**, Dr. Rakesh Kumar Sonker, in reorganization of significant academic activity, BBAU, Lucknow, 2013-2014.

Association With Professional Bodies

Other Activities

- Lifetime membership of Indian Science Congress Association (Membership No.: L28334)