

Bharat Tandon, Ph.D.

Assistant Professor of Chemistry, Indian Institute of Technology, Roorkee

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📄 PROFILE HIGHLIGHTS

- Ph.D. in Physical Chemistry with a focus on the design of nanomaterials and understanding their surface chemistry
- Strong foundation in the fundamental principles of chemistry and exceptional grasp of concepts in material science
- Experienced instructor with independent teaching contracts in physical chemistry and graduate teaching experience in introductory and advanced physical chemistry courses
- Skilled with technological utilization, student mentorship, product development, and pedagogical methods and, committed to diversity and inclusivity

📁 PRIOR PROFESSIONAL EXPERIENCE

Postdoctoral Scientist 02/2022 – 03/2024
The University of Waterloo Waterloo, CANADA

- Designed and synthesized new classes of functional nanocomposites for targeted applications in quantum technologies
- Wrote technical reports and made presentations to deliver complex information to technical and non-technical stakeholders and audiences and, project evaluation and prepared scientific communication documents
- Developed projects, training documents, and standard operating procedures for laboratory equipment and methods
- Mentored other scientists and team members on research and development projects

Postdoctoral Scientist 06/2019 – 12/2021 | Austin, USA
The University of Texas at Austin

- Designed inorganic smart nanomaterials for applications in thin film plasmonic electrochromic windows achieving an improved sensitivity of 80%
- Unraveled fundamental parameters that govern the surface structure of semiconductor nanocrystals
- Collaborated across a multitude of multi-disciplinary teams from different departments on core technologies
- Mentored undergraduate and graduate students on their research projects

Doctorate Student 08/2015 – 04/2019 | Pune, India
Indian Institute of Science Education and Research

- Synthesized and developed smart multifunctional nanomaterials for different technological applications
- Investigated and modified surface chemistry of nanomaterials for optoelectronic applications
- As lab safety in charge, complied with and regulated institute guidelines in handling hazardous chemicals and their proper disposal with the highest standards of health and safety practices

🎓 EDUCATION

Doctorate in Chemistry, IISER-Pune Pune, INDIA

Masters in Chemistry, IISER-Pune (CGPA 8.9/10) Pune, INDIA

Bachelors in Chemistry, St. Stephen's (CGPA 8.9/10) Delhi, INDIA

TEACHING EXPERIENCE

Instructor for CHM 254 (Principles of Thermodynamics) at the University of Waterloo (FALL 2023)

GRADUATE RESEARCH TEACHING EXPERIENCE

- Advanced Physical Chemistry Laboratory, IISER-PUNE (Fall 2015)
- Advanced Physical Chemistry Laboratory, IISER-PUNE (Fall 2016)
- Chemical Principles II, IISER-PUNE (Spring 2017)

TECHNICAL SKILLS

Electron Microscopy

SEM, TEM, STEM

Structural and Elemental Analysis

X-Ray Diffraction, ICP-AES, EDS, XPS, XRF

Material Processing

Spin Coating, Blade Coating, Thin-film Deposition, Surface Chemistry Modification, Heat treatment

Thermoanalytics

TGA, DSC, Tube Furnace, CVD

Spectroscopy

Optical microscopy, Ultraviolet, Visible, Infrared, Raman, XPS, Ellipsometry, EPR, MCD, DLS, IC, MS, X-ray Fluorescence

Nanoparticle Synthesis

Hot Injection, Slow Injection, One Pot, Solid State, Hydrothermal, Glove Box Operation

Electrical and Magnetic Characteristics

Electrochemistry, PPMS, SQUID

Softwares

Origin, Endnote, ImageJ, MS-Office Suite, Adobe Illustrator, CASA XPS, Diamond

PUBLICATIONS (SELECTED)

- Shao, Q.;† **Tandon, B.**;† Yin, P.; Radovanovic, P. V.; Atypical Excitonic Zeeman Splitting Pattern in Magnetically Doped In₂O₃ Nanocrystals: Competition between Native Defects and Dopants, **Chem. Mater.** 2024, doi.org/10.1021/acs.chemmater.4c00365
- **Tandon, B.**; Radovanovic, P.; "Size Control of the Mechanism of Exciton Polarization in Metal Oxide Nanocrystals through Fermi Level Pinning" **ACS Nano** 2023, 17, 14069
- **Tandon, B.**; Gibbs, S. L.; Dean, C.; Milliron, D. J. "Highly Responsive Plasmon Modulation in Dopant-Segregated Nanocrystals" **Nano Lett.** 2023, 23, 908
- **Tandon, B.**; Lu, H-C.; Milliron D. J.; "Dual Band Electrochromism: Plasmonic and Polaronic Mechanisms" **J. Phys. Chem. C** 2022, 126, 9228
- **Tandon, B.**; Zuleta-Shubert S. A.; Milliron D. J.; "Investigating the Role of Surface Depletion in Governing Electron Transfer Events in Colloidal Plasmonic Nanocrystals" **Chem. Mater.** 2022, 34, 777
- **Tandon, B.**; Gibbs, S. L.; Zydlewski, B. Z.; Milliron, D. J. "Quantitative Analysis of Plasmonic Metal Oxide Nanocrystal Ensembles Reveals the Influence of Dopant Selection on Intrinsic Optoelectronic Properties" **Chem. Mater.** 2021, 33, 6955.
- **Tandon, B.**; Ghosh, S.; Milliron, D. J.; "Dopant Selection Strategy for High Quality Factor Localized Surface Plasmon Resonance from Metal Oxide Nanocrystals" **Chem. Mater.** 2019, 31, 7752
- **Tandon, B.**; Agrawal, A.; Heo, S.; Milliron D. J.; "Competition Between Depletion Effects and Coupling in the Plasmon Modulation of Metal Oxide Nanocrystals" **Nano Lett.** 2019, 19, 2012
- **Tandon, B.**; Yadav, A.; Khurana, D.; Reddy, P.; Santra, P. K.; Nag, A.; "Size-Induced Enhancement of Carrier Density, LSPR Quality Factor and, Carrier Mobility in Cr-Sn codoped In₂O₃ NCs, **Chem. Mater.** 2017, 29, 9360
- **Tandon, B.**; Yadav, A.; Nag, A.; "Delocalized Electrons Mediated Magnetic Coupling in Mn-Sn codoped In₂O₃ NCs" **Chem. Mater.** 2016, 28, 3620
- **Tandon, B.**; Shanker, G. S.; Nag, A.; "Multifunctional Sn- and Fe-Codoped In₂O₃ Colloidal Nanocrystals: Plasmonics and Magnetism" **J. Phys. Chem. Lett.** 2014, 5, 2306

-Please click on the Google Scholar link [↗](#) for full list of publications

AWARDS

International Travel Scholarship, DST-SERB	2019
Fostering Science Fellowship, HERCULES	2019
Infosys Foundation Travel Award	2019
Fulbright Fellowship, USIEF	2017
CSIR-NET Senior Research Fellowship, CSIR	2015
Best Poster Award, FAM-2015	2015
CSIR-NET Junior Research Fellowship, CSIR	2015
Mohan Katyal Memorial Prize, St. Stephen's College	2013

CONFERENCES PRESENTATIONS

- Surface Canada 2023, McMaster University, Hamilton, Canada
- ACS Spring 2021, Virtual, USA
- MRS Fall Meeting 2019, Boston, USA
- HERCULES 2019 European School, Grenoble, France
- International Conference on Nanoscience and Technology 2016, Pune, India
- International Conference on Advanced Nanomaterials and Nanotechnology 2015, Guwahati, India
- Frontiers in Advanced Materials 2015, Bangalore, India
- Mumbai-Pune Semiconductor Meet 2015, Pune, India