AJINKYA SHINGOTE

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Summary

I am a second year doctoral student specializing in Physical Chemistry, currently conducting research under the guidance of Professor Gregory Hartland. My work focuses on strong exciton–plasmon coupling in metal–semiconductor hybrid structures. Broadly, I am interested in materials chemistry, with a particular passion for designing materials for energy-related applications.

Education

PhD in Material Science and Engineering Expected May 2029
Department of Chemistry and Biochemistry (GPA: 3.89 / 4.00) *University of Notre Dame, Notre Dame, IN, USA*
Advisor: Prof. Gregory Hartland

BSMS in Chemistry 2019-2024
Department of Chemistry (CGPA: 8.6 / 10) *IISER Pune, Maharashtra, India*

Projects and Internships

Graduate Research Assistant | *University of Notre Dame, Notre Dame, IN* 2024-Present
Advisor: Prof. Gregory Hartland
Topic: Probing Strong Exciton–Plasmon Coupling in Individual Semiconductor–Metal Nanostructures via Optical Microscopy

- Designed and built a custom optical setup for single-particle spectroscopy and characterization.
- Synthesized gold nanostructures with controlled morphology and optical properties.
- Performed COMSOL Multiphysics simulations to model electromagnetic field distributions.
- Analyzed spectral data and compared experimental results with numerical models.

Master's Research Project | *IISER Pune, Maharashtra, India* 2023-2024
Advisor: Prof. Angshuman Nag (Professor)
Topic: : Synthesis and Photophysics of Novel Layered Halide Perovskite Heterostructures

- Performed structural characterization using temperature-dependent X-ray diffraction.
- Conducted low-temperature steady-state and time-resolved photoluminescence measurements.
- Elucidated structure–property relationships by integrating low temperature crystallographic data with spectroscopic measurements.
- Interpreted the interplay between dark and bright exciton states at cryogenic temperatures to understand exciton dynamics in the heterostructures.

Research project student | *IISER Pune, Maharashtra, India* 2022-2023
Advisor: Prof. Angshuman Nag (Professor)
Topic: : Co-doping Te and Er in $Cs_2NaInCl_6$ Double Perovskite for Short Wave Infrared Emission

- Carried out the literature search for various dopants, hosts, and co-doping strategy.
- Assisted a graduate student, performing data collection and analysis.
- Contributed to the research paper titled "Short-Wave Infrared Emissions from Te^{4+}–Ln^{3+} (Ln: Er, Yb)-Codoped $Cs_2NaInCl_6$ Double Perovskites"

Detailed Research Skills

- Proficient in advanced materials synthesis techniques, including hydrothermal routes, controlled-atmosphere (glovebox) operations, and high-/low-temperature solid-state and solution-phase reaction.
- Experienced with structural and compositional characterization using PXRD, SCXRD, FESEM, EDS, ICP-MS, and thermal analysis tools (TGA, DSC).
- Skilled in optical spectroscopic techniques such as UV–Vis absorption, steady-state and low-temperature photoluminescence, PL lifetime (TCSPC).
- Competent in simulation and data-analysis workflows, including COMSOL Multiphysics modeling, structure visualization (VESTA, Mercury), crystallographic refinement (HighScore, FullProf), and quantitative analysis using OriginPro and IgorPro.

Publications

1. Habibul Arfin, Radha Rathod, Ajinkya Sundarnath Shingote, K. R. Priolkar, Pralay K. Santra, and Angshuman Nag, Short-Wave Infrared Emissions from Te_{4+}–Ln_{3+} (Ln: Er, Yb)-Codoped $Cs_2NaInCl_6$ Double Perovskites, *Chem. Mater.* 2023, 35, 7133–7143.
2. Ajinkya Sundarnath Shingote, Taniya Dutta, Parikshit Kumar Rajput, and Angshuman Nag, Thermal Evolution of the Structure and Luminescence of the Hybrid-Cation-Stabilized $[(4AMTP)PbBr_2]_2PbBr_4$ Layered Perovskite, *Chem. Mater.* 2024, 36, 0897–4756.
3. Parikshit Kumar Rajput, Parashurama Salunkhe, Manmayuri Sarma, Meghasree Basu, Animesh Gopal, Aprajita Joshi, Ajinkya Sundarnath Shingote, Surajit Saha, Atikur Rahman, and Angshuman Nag, Entropy-Driven Reversible Melting and Recrystallization of Layered Hybrid Perovskites, *Small* 2024, 2406735.
4. Bikram Ghosh, Ajinkya Shingote, Janak Bhandari, and Gregory V. Hartland, Energy Transfer and Radiation Damping in Gold–$MAPbI_3$ Heterostructures, *Chem. Sci.* 2025, 2041–6520.

Conferences

- PINDU, a regional inorganic chemistry conference uniting students and faculty from Purdue, Indiana University, and the University of Notre Dame, featuring research across metal–organic frameworks, nanomaterials, and bioinorganic chemistry (Presenter).
- Emerging Materials 2023, a conference on the latest research findings on the classes of materials, including low-dimensional materials, energy materials, sustainable materials, optoelectronic materials, and soft materials (Volunteer and Participant).
- Low Dimensional Materials 2022, a conference on recent advancements in low-dimensional materials with talks from international researchers (Participant).

Academic Achievements

- Ranked in the top 30 in Pune district in the Maharashtra State Scholarship Program.
- Passed with distinction in 10th and 12th standard examinations.
- Qualified in numerous state-level examinations (e.g., MTSE, NTSE, and JEE).