

Liu, Zhihui

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Summary

- Expertise in colloidal semiconductor nanomaterials focusing on III-nitride nanomaterials and degenerately doped semiconductor nanocrystals
- Advanced knowledge in physical chemistry of semiconductors
- Desire to learn electrochemistry and diversify my experience and techniques

Education

Ph.D. of Chemistry Major: Chemistry 2013—2019

Michigan State University (MSU), GPA: 3.79

Bachelor of Science Major: Applied Chemistry 2009—2013

Beijing University of Chemical Technology (BUCT), GPA: 3.69

Research Experience

Department of Chemistry, MSU 2013—2019

Supervisor: Prof. Rémi Beaulac

- Plasmonic behavior in degenerately doped small bandgap nanocrystals
- Quantum confinement resilience in colloidal InN nanocrystals
- Effects of free electrons on phonon behaviors in InN nanocrystals
- Optical oscillator strength of intraband transition in colloidal InN nanocrystals
- Influence of surface ligands on the charge storage capability of InN nanocrystals
- Development of hot-injection synthesis method of colloidal InN nanoparticles
- Correlating luminescence properties with surface defects of colloidal CdSe nanocrystals

State Key Laboratory of Chemical Resource Engineering, BUCT 2011—2013

Supervisor: Prof. Min Wei

- Synthesis of morphology tunable ferrite nanocrystals
- Hybrid fluorescent films and electrochemical sensors

Presentation Highlights

- Poster Presentation on “Colloidal Indium Nitride Nanocrystals: Synthesis and Optical-Electrical Properties” at Open House-Recruitment Weekend, MSU, MI 2018
- Oral Presentation on “Colloidal Indium Nitride Nanocrystals: Plasmon Behavior in the Nonparabolic Limit” at Joint Meeting between UM and MSU, MI 2017
- Poster Presentation on “Controlling and Understanding the Origin of Free Carriers in Colloidal Indium Nitride Nanocrystals” at APS National Meeting, Bowling Green State University, OH 2016
- Oral Presentation on “Removal of Organic Dyes from Waste Water Using Layered Double Hydroxide” at State Key Laboratory of Chemical Resource Engineering meeting, BUCT, Beijing, China 2013

Teaching Experience

Teaching Assistant in Chemistry Department, MSU 2013—2019

Mentor in ACS Project SEED Program 2017—2018

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Selected Publications

1. [Zhihui Liu](#), Mersedeh Saniepay, Rémi Beaulac. Effects of Free Charge Carriers on Optical Phonon Behavior of Doped InN Nanocrystals. **2019** (Manuscript in preparation)
2. [Zhihui Liu](#), Rémi Beaulac. Optical Oscillator Strength of Intraband Transition in Colloidal InN Nanocrystals. **2019** (Manuscript in preparation)
3. [Zhihui Liu](#), Austin Raithel, Rémi Beaulac. Influence of Surface Ligands on the Charge Storage Ability of Colloidal InN Nanocrystals. **2019** (Manuscript in preparation)
4. [Zhihui Liu](#), Lisa Janes, Mersedeh Saniepay, Rémi Beaulac. Charge Storage and Quantum Confinement Resilience in Colloidal InN Nanocrystals. *Chem. Mater.* **2018**, 30 (15), pp 5435–5443.
5. Mersedeh Saniepay, Chenjia Mi, [Zhihui Liu](#), E. Paige Abel, Rémi Beaulac. Insights into the Structural Complexity of Colloidal CdSe Nanocrystal Surfaces: Correlating the Efficiency of Nonradiative Excited-State Processes to Specific Defects. *J. Am. Chem. Soc.*, **2018**, 140 (5), pp 1725–1736.
6. [Zhihui Liu](#), Rémi Beaulac. Nature of the Infrared Transition of Colloidal Indium Nitride Nanocrystals: Nonparabolicity Effects on the Plasmonic Behavior of Doped Semiconductor Nanomaterials. *Chem. Mater.*, **2017**, 29 (17), pp 7507–7514
7. Niladri S. Karan, Yang Chen, [Zhihui Liu](#), Rémi Beaulac. Solution–Liquid–Solid Approach to Colloidal Indium Nitride Nanoparticles from Simple Alkylamide Precursors. *Chem. Mater.* **2016**, 28, 5601–5605.
8. Ruizheng Liang, Rui Tian, [Zhihui Liu](#), Dongpeng Yan, Min Wei. Preparation of Monodisperse Ferrite Nanocrystals with Tunable Morphology and Magnetic Properties, *Chem Asian J*, **2014**, 9(4).
9. Ruizheng Liang, Wenying Shi, Rui Tian, [Zhihui Liu](#), Dongpeng Yan, Min Wei, David G. Evans, Xue Duan. A Temperature Sensor Based on CdTe Quantum Dots/Layered Double Hydroxide Ultrathin Films *via* Layer-by-Layer Assembly, *Chem. Commun.* **2013**, 49, 969–71.

Awards

- Carl H. Brubaker, Jr. Endowed Fellowship in the Chemical Sciences 2019
- College of Natural Science Dissertation Completion Fellowship 2019
- Carl H. Brubaker, Jr. Endowed Fellowship in the Chemical Sciences 2018
- Thomas J. Pinnavais Fellowship in Inorganic Chemistry 2018

Outreach & Leadership Experience

Department of Chemistry, MSU 2013—2019

- Seminar host for more than 5 times
- Assisted on new graduate student candidate recruitment weekend every year

Technical Skills

- Expertise in analytical techniques: TEM, SEM, EDS, XRD, XPS, UPS, AFM, UV-vis-NIR, FTIR, Raman, NMR, photoluminescence, lifetime testing, CV, ICP-OES, AA, HPLC
- 6 years of experience working under inert atmosphere: glovebox and Schlenck line
- Software and online servers: Igor Pro, Origin, LabView (certified associated developer), MATLAB, MS office, ChemDraw, MestReNova, ImageJ, etc.