Mykyta Dementyev

PhD Candidate

+1 (323) 556 - 1870
mdementyev@psu.edu
https://www.mykytadementyev.com/

Personal Profile

Materials scientist/engineer, interested in learning the synergistic relations between crystal and polymer components within nanocomposite systems for the future development of smart materials. Specifically, I am researching the effects of polymer/crystal interactions in material systems to tune optical properties. I intend to pursue academic positions in order to progress scientific advances in the field of optical properties of materials for applications in communications and data processing.

Core Skills

- Photoluminescence Characterization (Fluorimetry and UV-Vis spectroscopies)
- Electron Microscopy (Transmission and Scanning Electron Microscopes)
- Molecular Spectroscopy (FT-IR)
- Surface Characterization (Atomic Force Microscopy)
- Electrical Characterization (Dielectric Spectroscopy and Polarization)
- Polymer Characterization (DSC, TGA, and SEC)
- X-Ray analysis (XRD, SAXS, and WAXS)
- IGOR Pro and Mathematica for Analysis
- C++ and Python for Scripting

Publications & Accepted Proposals

- Dementyev, M.; Jones, L.; Brennan, M.; Grusenmeyer, T.; Waugaman, S.; Mathers, T.; and Hickey, R. Polymer Macroligands Passivate Halide Perovskite Surfaces. *RSC Appl. Polym.*, **2024**, 2, 857-869. DOI: 10.1039/D4LP00114A
- Waugaman, S.;† Dementyev, M.;† Abbasi GharehTapeh, E.; Lopez, C.; Mathers, R.; and Hickey, R. Nanoparticle Loading in Swollen Polymer Gels: An Unexpected Thermodynamic Twist. *Nano Letters*, **2025**, DOI: 10.1021/acs.nanolett.4c06501
- Goel, S.;† Dementyev, M.;† Hickey, R. Controlling Polymer Phase Separation and Nanoscale Self-Assembly via Binding-Induced Polarization. **Accepted proposal** for scattering experiments at NSLS-II source at Brookhaven National Laboratory for 2024-2025 cycle

† Indicates equal contribution to the work

Education

2022 - 2027	**Pennsylvania State University**	PhD in Materials Science and Engineering
2020 - 2022	**University of California Davis**	BS in Physics and a Chemistry Minor

Research Summary

Aug. 2022 – Present **Graduate Researcher**
The Pennsylvania State University

Finished project included studying the effects of polymer chemical functionality on the resulting optical properties of perovskite crystal system. Specifically, we looked at a hybrid organic/inorganic lead halide perovskite crystal system and found that nitrogen-containing polymers coordinate with undercoordinated lead ions on the surface of perovskites which passivate surface defects, resulting in the composite material with superior fluorescence properties. The current project includes the investigation of non-linear optical system (lithium niobate ($LiNbO_3$)) and how polymers can be incorporated to tune the resulting optical phenomena, like second harmonic generation (SHG).

Mar. 2021 – June 2022 **Student Researcher**
University of California, Davis

Collected and analyzed photo-responsive data from organic/inorganic methylammonium halide perovskite single micro-crystals by performing Scanning Photocurrent Microscopy (SPCM) to study the Circular Photogalvanic Effect (CPGE) or Rashba splitting. Focused on modifying the synthesis and fabrication procedure to change the doping in various perovskite microcrystals, such as $MAPbBr_3$, $MAPbI_3$, $FAPbBr_3$, and $CsPbBr_3$.

Teaching Experience

Nov. 2018 – Aug. 2021 **Supplemental Instructor and Science Tutor**
Los Angeles City College, STEM Pathways Program

Aided mathematics professors in tutoring and grading students' academics. Additionally, tutored STEM students in college-level courses in Mathematics, Physics, and Chemistry

Aug. 2018 – Aug. 2020 **Statistics and Science Tutor**
Los Angeles City College, Office of Special Services

Tutored college-level Statistics and Science students with learning differences. Specifically, have the necessary skills to work with visually impaired students and students with ADHD. Additionally, assisted the manager with scheduling and student relations.

Conference Presentations

November 2024 **Centennial Celebration of Central PA Chemistry ACS**
Penn State

Poster Title

Polymer Macroligands Passivate Perovskite Surfaces

June 2024 **Mid-Atlantic Regional ACS**
Penn State

Poster Title

Polymer Macroligands Passivate Perovskite Surfaces **Received Best Poster Award**

Aug. 2021 **Annual Molecular Foundry Nanoscience Conference**
UC Berkley - Virtual

Poster Title

Long Distance Exciton Transport in Single Crystal Methylammonium Lead Bromide (MAPbBr3) Perovskite Nanoribbons

Outreach

Spring 2022 – Present **Research Mentor**
Hickey Research Group

Guided three Materials Science and Engineering undergraduate students to conduct research safely and effectively. I am currently assisting one student in writing a manuscript for submission.