

Cleveland State University

EngagedScholarship@CSU

Undergraduate Research Posters 2015

Undergraduate Research Posters


2015

Developing affordable wet-sample electron microscopy integrated with a temperature controlled sample holder

Dan Terrano

Cleveland State University

Follow this and additional works at: https://engagedscholarship.csuohio.edu/u_poster_2015

 Part of the [Life Sciences Commons](#), [Medicine and Health Sciences Commons](#), and the [Physical Sciences and Mathematics Commons](#)

[How does access to this work benefit you? Let us know!](#)

Recommended Citation

Terrano, Dan, "Developing affordable wet-sample electron microscopy integrated with a temperature controlled sample holder" (2015). *Undergraduate Research Posters 2015*. 31.

https://engagedscholarship.csuohio.edu/u_poster_2015/31

This Book is brought to you for free and open access by the Undergraduate Research Posters at EngagedScholarship@CSU. It has been accepted for inclusion in Undergraduate Research Posters 2015 by an authorized administrator of EngagedScholarship@CSU. For more information, please contact library.es@csuohio.edu.



Developing affordable wet-sample electron microscopy integrated with a temperature controlled sample holder

College of Sciences and Health Professions

Student Researcher: Dan Terrano

Faculty Advisors: Petru Fodor and Kiril A Streletzky

Abstract

Scanning electron microscopy (SEM) is widely used to analyze the size, shape and composition of material systems. However, using this tool for analyzing systems such as particles suspended in solution, requires drastic sample alterations, such as precipitation and fixation. Besides altering their environment, this exposes the particles to the harsh conditions within an electron microscope, such as high vacuum and electron beam exposure. To this end, the first goal of this study was to develop methodologies for imaging wet samples using electron microscopy. This is realized by creating a sandwich structure containing the solution of interest between a partially electron transparent window and a silicon substrate. The ability of the developed imaging cells to provide good imaging conditions is demonstrated with a variety of samples including polystyrene spheres, polymeric microgels and spindle shaped nanoparticles. As some of the systems investigated are temperature sensitive, the second goal of the project was to develop a temperature controlled stage that can be integrated with the SEM. In the future this heating stage will be used alongside the wet samples to image microgels above and below their critical solution temperature.