PMC X62 Call for Papers

PMC X62 - Obtaining Reliable and Relevant Insights in *In Situ* Microscopy and Spectroscopy Studies of Reactions in Liquids and Gases: A Discussion on Re-producibility, Robustness and Rigor

Organized by the MSA Electron Microscopy in Liquids and Gases Focused Interest Group*

Sunday, July 28, 2024 • 8:30 AM - 5:00 PM
Separate registration is required *– see registration form (Spring 2024)*

INCLUDED IN THE REGISTRATION FEE:
Breakfast, AM Break, Lunch, PM Break

ORGANIZERS:
Grace Burke, Idaho National Laboratory
See Wee Chee, Fritz Haber Institute of the Max Planck Society
Piyush Haluai, Arizona State University
Patricia Kooyman, University of Cape Town
Kinga Unocic, Oak Ridge National Laboratory
Yuanyuan Zhu, University of Connecticut

In this PMC, we hope to foster lively discussions regarding recent innovations propelling the quantitative analysis of materials phenomena during reactions in liquids and gases. With the growing availability and variety of commercial holders and microscopes, the use of *in situ*/*operando* liquid and gas-phase electron microscopy has become more accessible. However, these experiments are still regarded as complex undertakings. Common challenges include attaining high spatial resolution while mitigating beam effects, ensuring data reproducibility in systematic studies, and extracting meaningful insights from multi-dimensional datasets. We will delve into these challenges that arise when conducting studies using liquid and gas-phase electron microscopy and explore innovative strategies that tackle these challenges. These discussions will be guided through invited talks delivered by established leaders and emerging scientists in the field. Vendors will also present their latest developments that simplify the execution of these experiments or enhance their analytical capabilities.

We will also host a poster session that welcomes all PMC participants, particularly newcomers to the *in situ*/*operando* techniques, to present their work and openly discuss the challenges when initiating their work. Participants are encouraged to share their insights into handling null results and strategies to address similar challenges in their experiments successfully or unsuccessfully. Poster titles such as, “Getting your science right: How to avoid having Reviewer#2 reject your paper”, and

"Navigating the challenges of my first year with an *in situ* holder" are perfectly acceptable. Prizes will be awarded to the most whimsical and exciting posters. Submission details can be found below.

Invited Speakers:

- Peter Crozier, Arizona State University
- Walid Dachraoui, EMPA - Swiss Federal Laboratories for Materials Science and Technology
- Jennifer Dionne, Stanford University
- Birk Fritsch, Helmholtz-Institut Erlangen-Nürnberg für Erneuerbare Energien
- Nathan Gianneschi, Northwestern University
- Thomas Lunkenbein, Fritz Haber Institute of the Max Planck Society
- Savannah Turner, Utrecht University
- Nestor Zaluzec, Argonne National Laboratory

TOPICS COVERED:

- Quantitative *in situ* and *operando* studies of materials phenomena under reaction conditions
- Design of experiments for liquid and gas phase electron microscopy
- Rationalizing beam-induced effects and their impact under different conditions
- Relevance of *in situ* and *operando* observations: balancing resolution versus statistics,
- Multi-modal and correlative studies for spatially resolved spectromicroscopy
- Data-driven approaches for handling multi-object or multi-scale *in situ* studies
- Automation of experiments (e.g., metadata tracking, on-the-fly analysis, and data compression)

Poster Abstract Submission:

Poster abstracts should be submitted using the standard M&M template (figures are optional) and **sent to emlgfig@gmail.com by 1st May 2024** (rather than the M&M submission website).