

Decouple the Observation from the Operando Electrochemistry Measurement

Scientific Achievement

X-ray beam interactions and electrochemical cell features can perturb electrode reactivity and must be optimized for accurate operando measurements.

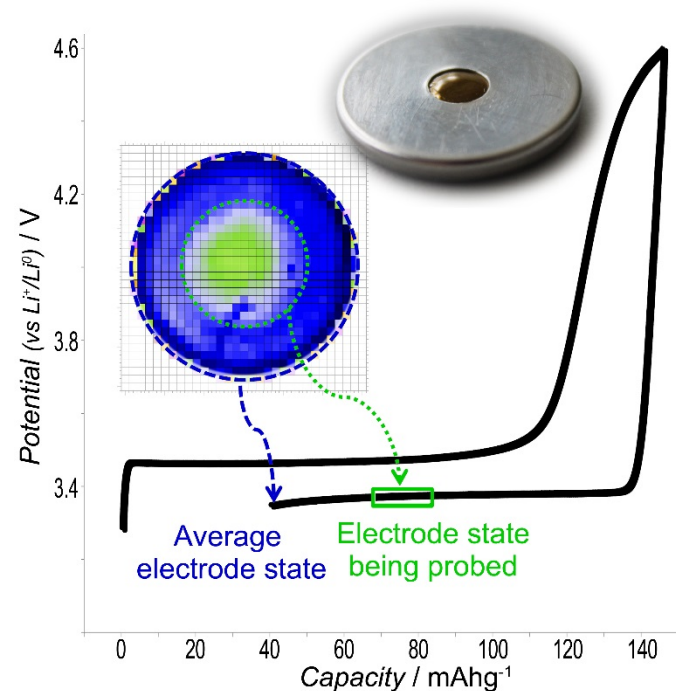
Significance and Impact

Operando studies must reflect what is being measured, and not how the measurement is done. The best practices identified here will avoid misleading and potentially conflicting results.

Research Details

- Distributions in electrode reaction state were mapped after cycling under simulated operando configurations.
- The impact of X-ray beam interactions and the operando cell, with possible non-uniformity (pressure and/or conductivity) due to the X-ray window, were evaluated.
- The most accurate insights will come from operando measurements where X-ray absorption is minimized (at high X-ray energies and far from absorption edges) and in cells with rigid, conductive X-ray windows

Work performed at Argonne National Laboratory



Like a cat-in-a-box, experiments that observe an electrochemical reaction can change the reaction state



Olaf J. Borkiewicz, Kamila M. Wiaderek, Peter J. Chupas, Karena W. Chapman, *J. Phys. Chem. Lett.*, **2015**, 6 (11), pp 2081–2085. DOI: 10.1021/acs.jpcclett.5b00891



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