

AMPIX cell: expanding operando analytical tools for battery research

Scientific Achievement

We have designed a versatile electrochemical cell suitable for operando X-ray studies during battery cycling. The electrochemical cell is compatible with many synchrotron-based X-ray tools—Argonne's Multi-Purpose In-situ X-ray or AMPIX cell.

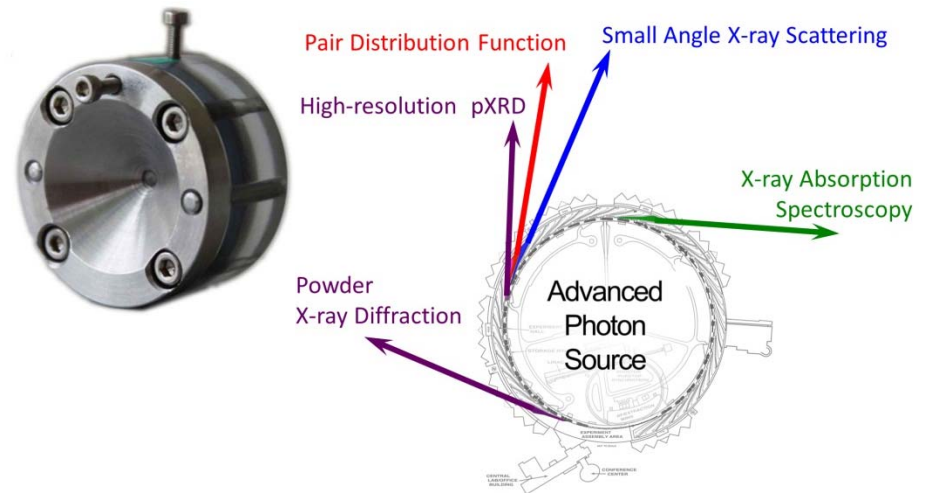
Significance and Impact

The AMPIX cell is a tool that enables new types of analyses to extend our understanding of batteries to the next level. Different types of measurements, all compatible with the AMPIX cell, can be correlated to gain comprehensive insights into the coupled electronic, structural and morphological transformation that occur within batteries. This can be achieved with unprecedented sensitivity and time-resolution, allowing complex processes to be unraveled and dynamic species to be captured.

Research Details

The suitability of the AMPIX cell for a broad range of synchrotron-based X-ray scattering and spectroscopic measurements has been demonstrated with studies at 8 Advanced Photon Source beamlines to date. Compatible techniques include Pair Distribution Function analysis, High-resolution X-ray Powder Diffraction, Small Angle Scattering and X-ray Absorption Spectroscopy. Patent pending.

O. J. Borkiewicz, B. Shyam, K. M. Wiaderek, C. Kurtz, P. J. Chupas and K. W. Chapman – J. Appl. Cryst. 2012, 45, 1261. DOI:10.1107/S0021889812042720
This work was performed at Argonne National Laboratory.



The universal applicability of the AMPIX apparatus eliminates any cell-dependent variability, providing directly comparable data from complementary methods.



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