InViMOD – Intelligent Visualisation of Multimodal Operando Data for Energy Systems: A FAIR Workflow

OSCARS
Open Science Clusters' Action for Research & Society

InViMOD will develop an open, modular platform for exploring, synchronising, and analysing complex multimodal datasets generated by *operando* experiments in advanced battery research and materials science. It will provide a unified, interoperable digital workflow to merge and visualise heterogeneous time-resolved data streams generated with techniques spanning X-ray imaging, absorption, Raman and UV-Vis spectroscopies, electrochemical impedance spectroscopy (EIS), and cycling data.

PaNOSC
Photon and Neutron Science

Challenge

Many of Europe's leading research infrastructures (RIs) and laboratories produce vast volumes of real-time experimental data. However, these data are fragmented across formats, instruments, and disciplines, preventing their full reuse and joint interpretation.

Solution

InViMOD will provide an open-source, FAIR-compliant platform for collecting, aligning, visualising, and analysing heterogeneous operando datasets. As an initial demonstrator, the project will use lithium-sulfur (Li–S) batteries. The InViMOD platform will allow scientists to correlate chemical, structural, and electrochemical changes in real time.

Scientific Impact

InViMOD's software architecture is designed to be chemistry-agnostic and applicable to emerging systems, such as sodium-ion, lithium-metal, and solid-state batteries, as well as to broader domains including electrocatalysis, corrosion, and thin film materials research.

Partners

Helmholtz Zentrum Berlin, Batalyse GmbH

https://oscars-project.eu/projects/invimod-intelligent-visualisation-multimodal-operando-data-energy-systems-fair-workflow