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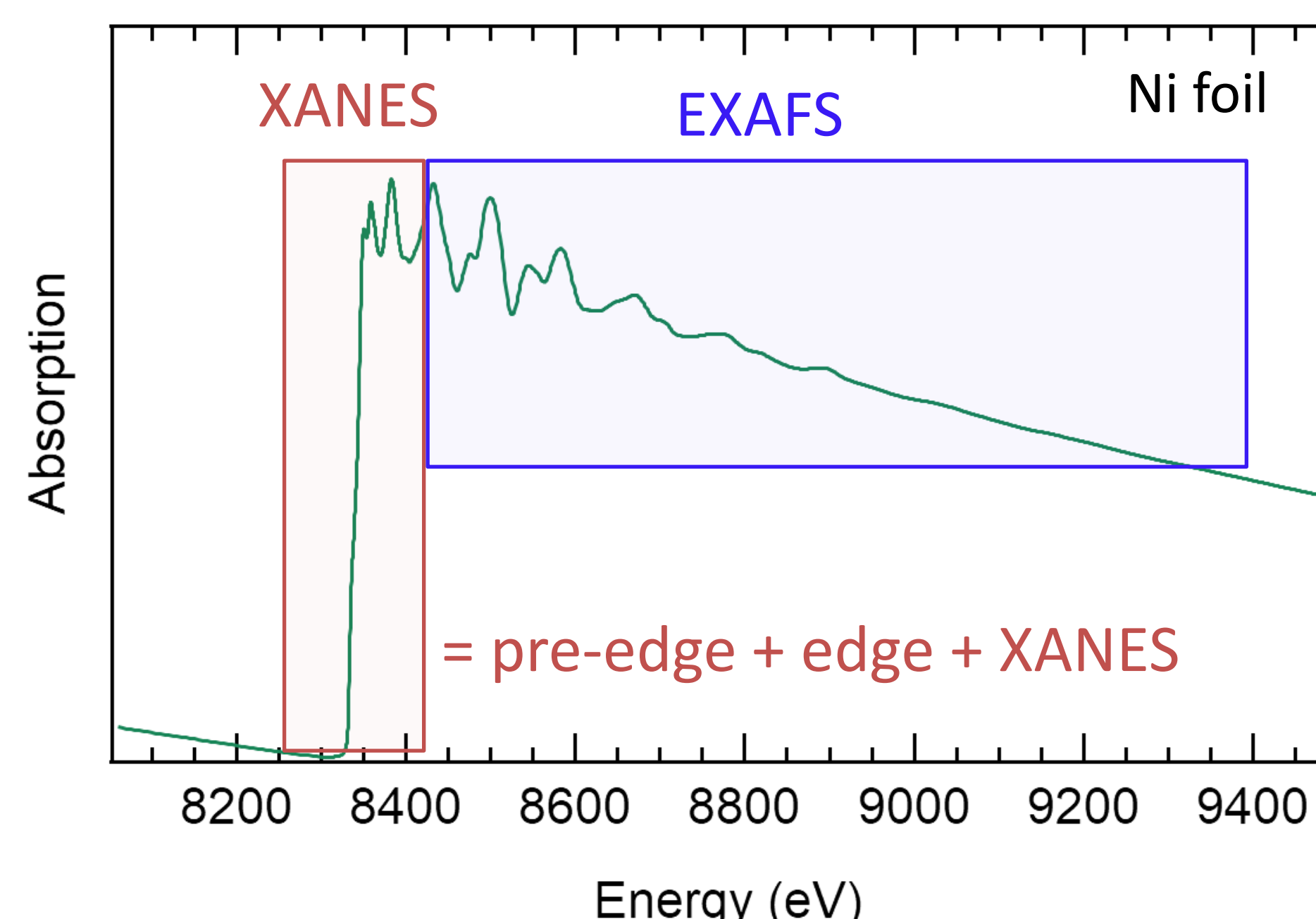
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## Why?

- Battery materials study requires insight from multiple techniques
- e.g. operando x-ray absorption experiments coupled with electrochemical characterization
- Additional complexity in synchrotron-based experiments: continuously increasing time/space resolution.  
→ **higher data dimension** and **larger data volume**.

New tool for asynchronous data aggregation and semi-automated data processing becomes thus decisive during and after each experiment.

## Example of XAS spectrum

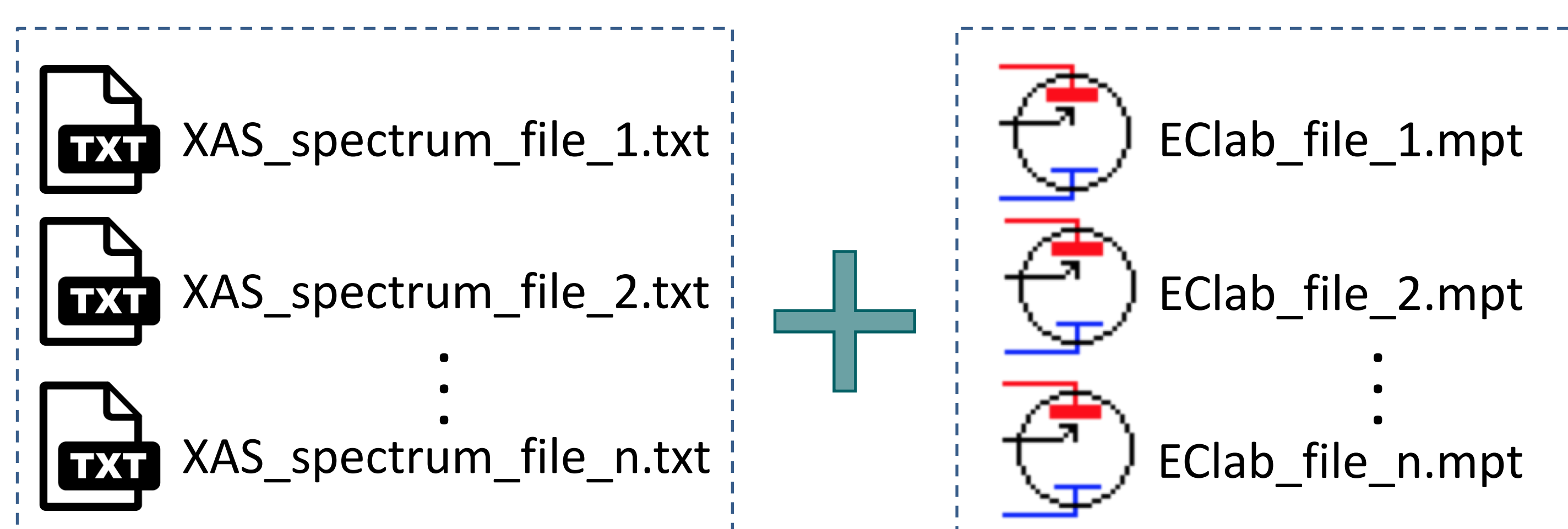


## How?

- Python Jupyter notebook with a developed library for data aggregation and interactive visualization tools, focused on the XANES region.
- Easy comparison:
  - Over time (for one cell)
  - Among different types of cells

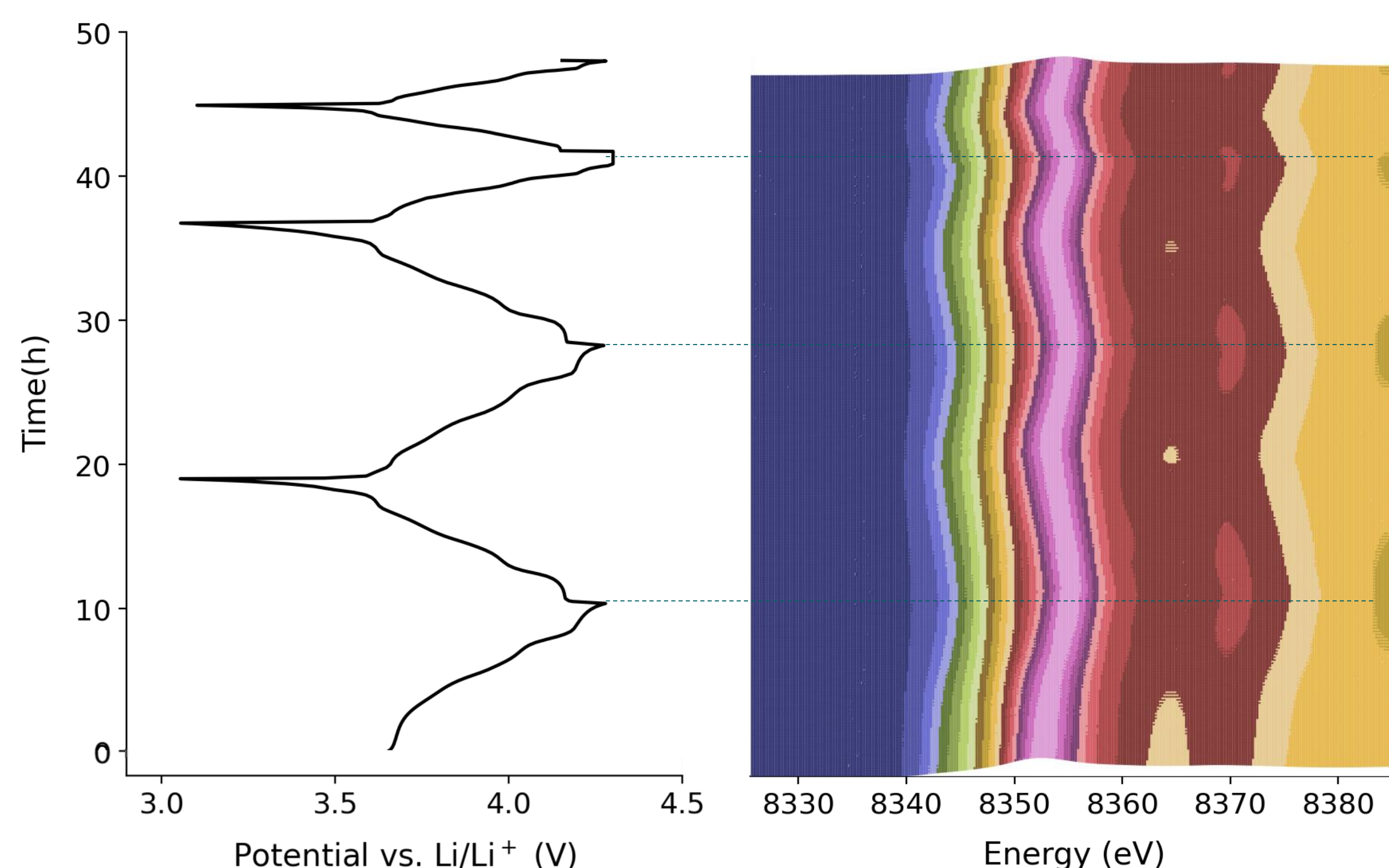
LINK TO PACKAGE (Jupyter Notebook with example)

<https://github.com/GhostDeini/perex>

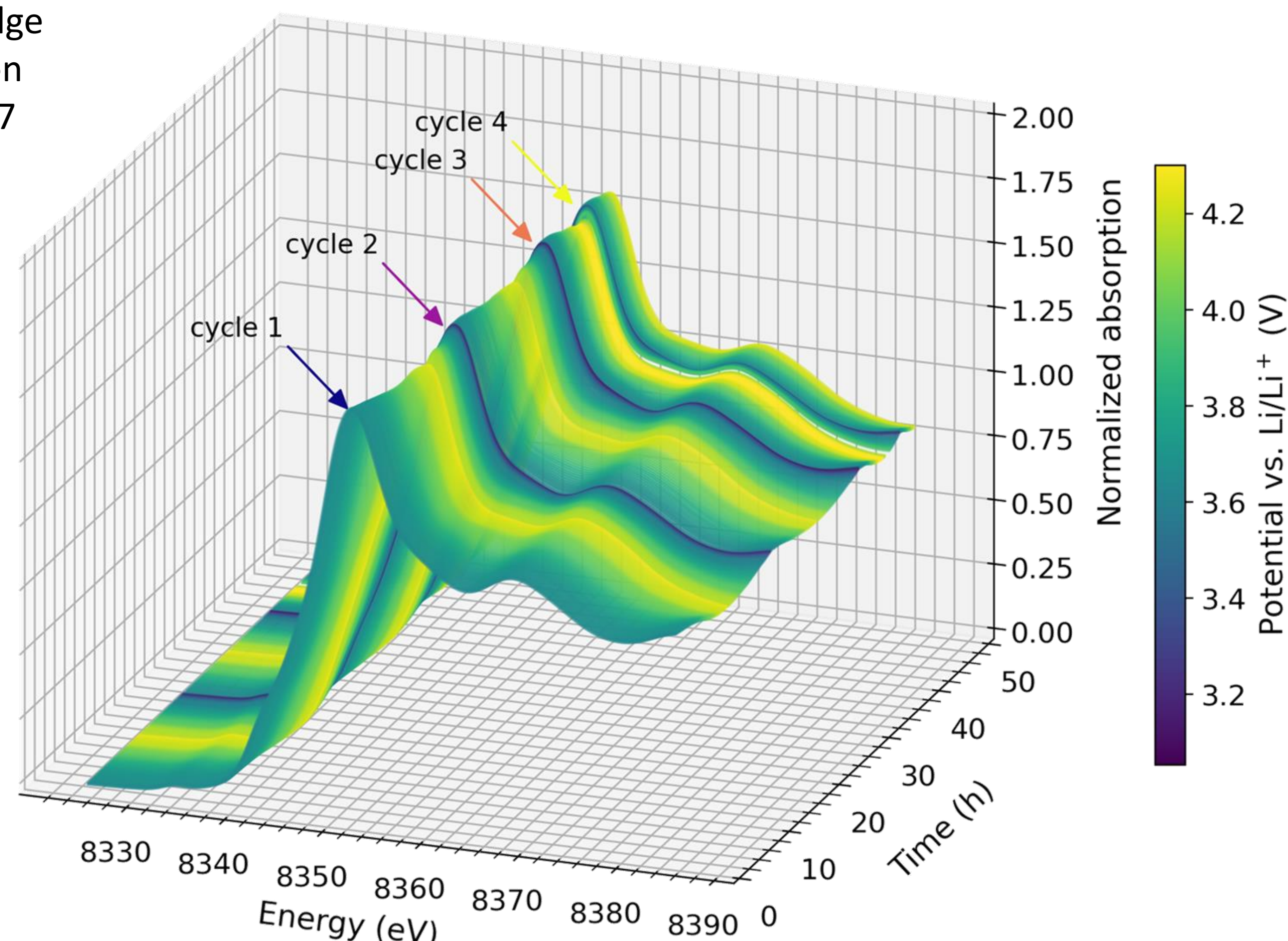


Aggregated data (hyperspectral map)

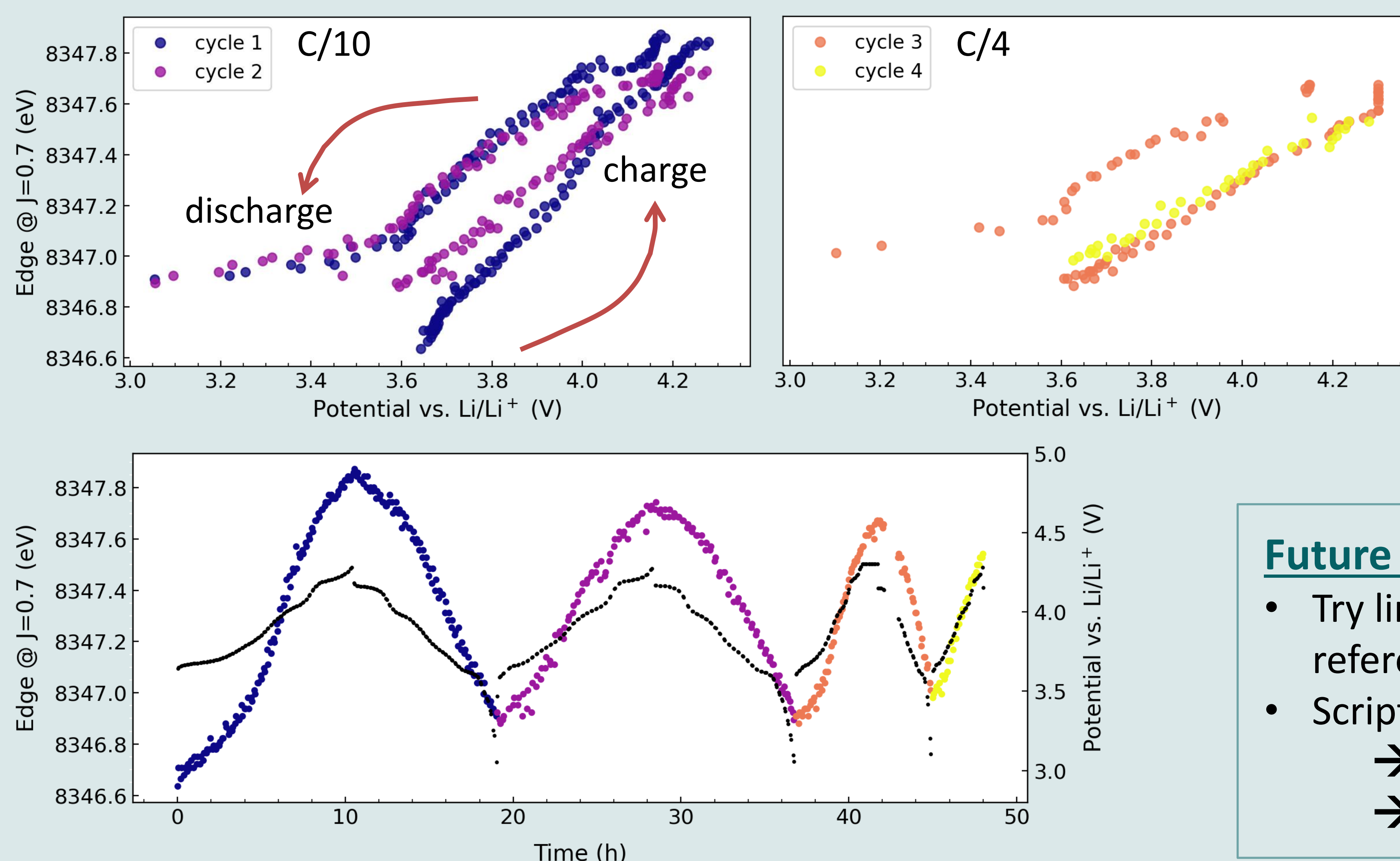
Hands-on interactive visualization tools



Operando Ni K-edge XANES spectra on LNO vs Li in LP57 (July 2022)

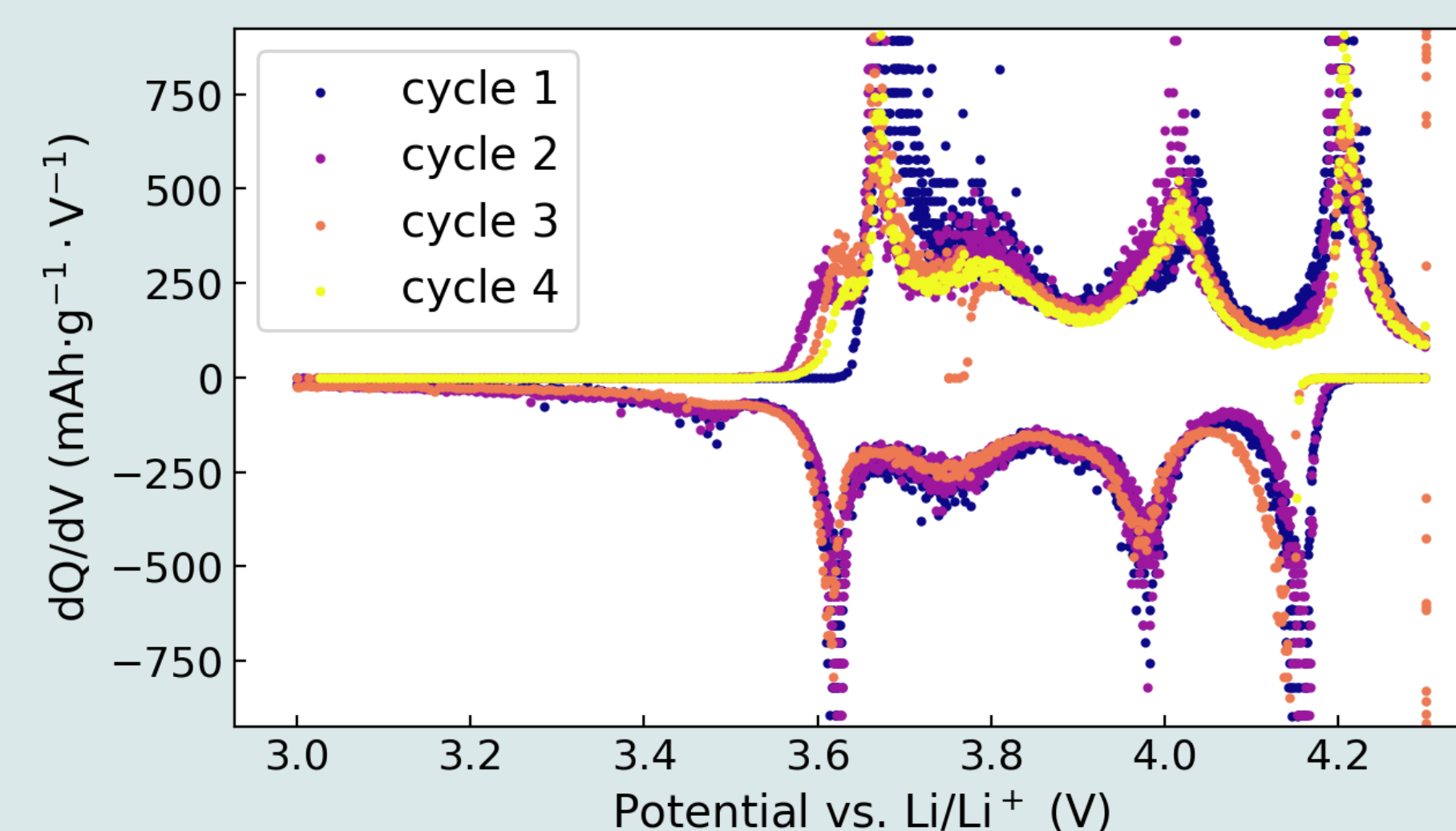


## Evolution of the edge position at different C-rates



## Basic visualization of the electrochemical data

Differential capacity vs. potential



## Future work:

- Try linear combination fitting of spectra using modeled reference samples (e.g. using FEFF, MXAN)
- Scripts for semi-automatic data processing in Larch python.
  - pre-edge fitting
  - EXAFS region.