

Martedì 15 luglio 2025 alle ore 14:00 presso l'aula A

il **Prof. Frédéric Kanoufi**

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terrà il seminario dal titolo:

Seeing is Predicting? Optical Imaging of Electrochemical Systems

Electrochemistry is central to renewable energy storage and conversion, powering a range of emerging sustainable technologies. Optimizing these devices requires a detailed understanding of reaction mechanisms at micro- and nanoscale, as they are closely linked to material microstructure. This calls for high-resolution, multi-modal characterization of electroactive materials, ideally under operando conditions.

The rise of operando imaging techniques reflects this growing need. These methods enable in situ visualization of materials during operation, revealing structural dynamics and linking performance to microscopic changes. Among them, **operando optical microscopy** offers key advantages: high sensitivity, spatial and temporal resolution, throughput, low invasiveness, and ease of use.

This talk will present recent advances in operando optical imaging applied to electrochemical systems. It will focus on developments from our group in instrumentation, analytical methods, and theoretical approaches, illustrating how these techniques contribute to a deeper understanding of energy-related processes.

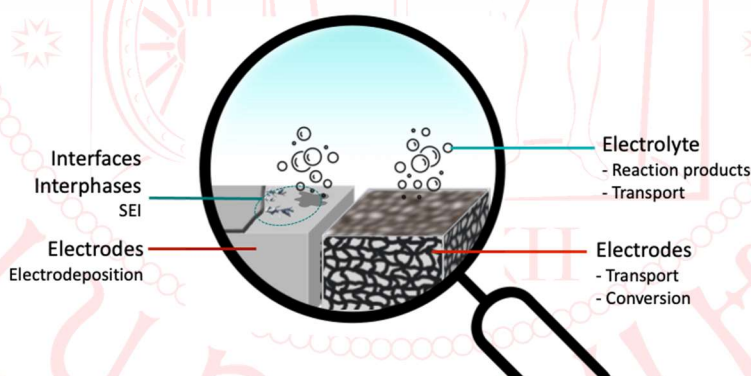


Figure: Imaging electrochemical processes operando with an optical microscope [2]

References:

[1] X. Xu et al., The new era of high throughput nanoelectrochemistry. *Anal. Chem.* (2023), 95, 319–356. DOI:

[10.1021/acs.analchem.2c05105](https://doi.org/10.1021/acs.analchem.2c05105)

[2] F. Kanoufi, Electrochemistry and Optical Microscopy. In *Encyclopedia of Electrochemistry* (2021), A.J. Bard (Ed.), pp1-80. DOI: [10.1002/9783527610426.bard030108](https://doi.org/10.1002/9783527610426.bard030108)

Prof. Stefano Agnoli

Il Direttore del Dipartimento
Stefano Mammi