Time and Space Resolved Methods and In Situ Instrumentation for *Operando* Bioelectrochemistry: Emerging Problems in Energy, Health and Bio-Inspired Materials

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Abstract: In this mini-conference, several techniques for real-time measurements under bioelectrochemical control will be discussed. I shall show experimental setups that use differential electrochemical mass spectrometry (DEMS), electron paramagnetic resonance (EPR), Micro-FTIR (mid region), far infrared spectroscopy (FIR, below 500 cm^{-1}) and X-ray absorption spectroscopy (XAS), in order to provide on-line, in situ and *operando* information.[1-3] Real-time monitoring of the conversion of substrates using redox enzymes will be discussed for dehydrogenases and oxidases. On-line measurements were able to answer some important question related to the pathway of redox reactions, such as the calculation of kinetics parameters from metabolites generated in DEMS. In addition, redox chemistry of drugs as well as its dynamics inside living cells (e.g. lung carcinomas) could be studied by using Micro-FTIR. Other examples of application will be presented and discussed in detail.

References

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