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The structure of solid-liquid and gas interfaces: studies with Synchrotron Radiation

Tuesday, 6 September 2022 11:30 (45 minutes)

A detailed knowledge of the molecular structure of the interface between material surfaces and gases, and of Electrodes and Electrolytes, is crucial for solving fundamental problems in fields like catalysis, wetting, corrosion, electro-photochemistry, batteries and many others. Until now this has been hampered by the scarcity of surface-sensitive microscopy and spectroscopy techniques that can operate in gas and liquid phases at environmental pressures in the Torr to Atmosphere range. In the last decades my group in Berkeley has developed a variety of techniques and methodologies that break this pressure barrier. I will illustrate the techniques we developed and how we used them to determine the atomic structure of interfaces between metal electrodes (Cu, Au, Pt, TiO2, graphene), soft matter (polymers, biomaterials) in gas and liquid environments, and in the presence of electric fields. The use of Synchrotron-based photon spectroscopies (XPS, NEXAFS, Infrared, and others) combined with of reaction cells with windows transparent to photons and electrons has provided detailed information of the chemical state of electrodes and electrolyte structure in the electrical double layer.

Would you like to participate in the Poster Prize competition?

No

Primary author: SALMERÓN, Miquel (Materials Science Division of the Lawrence Berkeley National Laboratory / Materials Science and Engineering of the University of California, Berkeley)

Presenter: SALMERÓN, Miquel (Materials Science Division of the Lawrence Berkeley National Laboratory / Materials Science and Engineering of the University of California, Berkeley)

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