What IR spectroscopy tells about water structure at Pd multilayers modified Au surface and about the mechanism of electrochemical reduction of graphene oxide.

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IR spectroscopy is a powerful tool to provide molecular level information about processes taking place at the electrode solution interface. In this lecture I will describe two studies to illustrate its potential. The first concerns surface enhanced IR reflection absorption spectroscopy (SEIRAS) to determine the structure of water at surfaces of multilayers Pd modified Au electrode surface. I will show that the order of surface water changes with the thickness of Pd layer and with the electrode potential. I will also demonstrate how these changes affect the rate of hydrogen evolution reaction.[1,2] The second describes application od photon modulation IR reflection absorption spectroscopy (PMIRAS) to determine composition of the surface of graphene oxide (GOx) and its changes during electroreduction that converts GOx to graphene (rGO) behaving as supercapacitor.[3]

1. Yuejiao Zhang, Zhangfei Su, Jianfeng Li, Jacek Lipkowski, *J.Electroanal.Chem.* DOI: 10.1016/j.jelechem.2021.115243
2. Yue-Jiao Zhang, Zhang-Fei Su, Jian-Feng Li, Jacek Lipkowski, *J.Phys.Chen.C* , **2020**,*124*, 13240-13248.
3. ZhangFei Su, Jonathan Quintal, Muhanad Al-Jeda, Antony R. Thiruppathi, Jacek Lipkowski, Aicheng Chen, *J. Phys. Chem. C,* **2023**, 127, 44, 21644–21655