



Wolfson Department of Chemical Engineering Seminar
Lecture Hall 6, Wolfson Department of Chemical Engineering,
Wednesday June 6th at 1:30pm

Prof. David Zitoun
Department of Chemistry
Bar-Ilan University, Ramat Gan, Israel

Catalyst Design and Electrochemical Activation:
Application to Water Splitting

One of the bottlenecks towards the successful implementation of alternative energies is the lack of methods for sustainable generation of hydrogen fuel (energy carrier). Given that water will be at the very least an important component of the hydrogen production feedstock, sustainable catalysts are needed for the electrochemical generation of hydrogen from water.

In this lecture, we shall show several examples of electrochemical activation for electrocatalytic splitting of water in alkaline or acidic conditions based on olivine materials for the anode and sulfide materials for the cathode. We report on the activation of a silver-based catalyst that outperforms platinum for the hydrogen evolution reaction (HER) in acidic conditions at high current densities (above 1,100 mA/cm²). The catalyst is chemically and electrochemically stable over days. The starting material, silver sulfide, is synthesized by a simple and scalable chemical vapor deposition process or colloidal reaction.

Upon electrochemical activation, the pristine material is converted to silver oxo-sulfide which is highly active towards HER. The modeling, microscopy and spectroscopy demonstrates the stability of a phase highly loaded with hydrogen atoms, in the form of hydroxyl groups and the stability of sulfoxide sites which exhibit high catalytic activity.

Refreshments will be served at 1:15pm