Host: Tianbiao Liu

Henry S. White

University of Utah

When: March 27

Where: W330

Time: 4:00 pm

The Physics and Electrochemistry of Nanobubbles

Our laboratory has developed a general electrochemical approach for investigating the formation and properties of a *single* nanobubble (e.g., H_2, O_2, CO_2, and N_2) with a radius between 5 and 50 nm. For instance, a N_2 nanobubble can be formed at a Pt nanodisk electrode by oxidizing hydrazine (N_2H_4) to create a supersaturated solution of N_2 adjacent to the electrode surface. Due to their nanoscale dimensions, the Laplace pressure within these nanobubbles is on the order of ~100 atm. This presentation will describe measurements of the supersaturation required to electrochemically nucleate a bubble, the critical size of the smallest stable bubble nucleus, stochastic nucleation times, and the internal pressure within these nanobubbles. Electrochemical measurements of nanobubbles also provide insight into the structure and chemical dynamics of electrochemical three-phase solid/liquid/gas boundaries, e.g., H^+ reduction kinetics at a three-phase boundary, as well as estimation of the width of the three-phase boundary.

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