

Gerry Stafford

N.I.S.T

Gaithersburg, Maryland 20899, USA

Host: Giovanni Zangari

“Surface and Growth Stress at Solid Electrodes”

When: Monday, October 6 2008

Time: 4:00 - 5:00 PM

Refreshments: 3:30 - 4:00

Room: Wilsdorf 101

ABSTRACT:

The underpotential deposition (upd) of metal monolayers onto foreign metal substrates is important to several technologies. In metal deposition involving Stranski-Krastanov nucleation and growth, the upd layer forms prior to the formation of 3-D crystals so that the deposition processes in the upd region to a large extent determine the growth and subsequent properties of bulk thin films. In electrocatalysis, sub-monolayers of metals such as Bi and Pb on some noble metal surfaces have shown enhanced catalytic activity for a variety of electroreduction processes. Modified catalytic activity has been observed for Pd overlayers consisting of a few monolayers. An *in situ* probe gaining popularity in electrochemistry involves the measurement of surface and growth stress by monitoring the curvature of a wafer or cantilever while in solution and under potential control. Surface stresses on the order of 0.01 N/m can be resolved, sufficient to study the adsorption of molecular monolayers onto the electrode surface. This talk examines the surface stress associated with the upd of Bi, Pb, and Pd onto (111)-textured Au cantilever electrodes. In addition the stress associated with the interaction of electrochemically generated hydrogen on ultrathin Pd adlayers, nominally 1 to 10 monolayers, is examined.

Bio:

Gery Stafford is a research scientist at the National Institute of Standards and Technology in Gaithersburg, MD. He earned his B.S. in chemical engineering from the University of Notre Dame and his doctorate in materials science from the University of Virginia. From 1980 to 1986 he was a research staff member with Celanese Research Co., Summit, NJ, where his work focused on electrocatalysis and fuel cells. He joined NIST in 1986 and served as the Leader of the Electrochemical Processing Group from 1994 to 2005. His research interests include the structure and properties of electrodeposited thin films and the electrodeposition of aluminum-based alloys from ionic liquids.