

Electrochemistry Plus Ultra-High Vacuum Methods

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Strategies for investigating chemical and electrochemical processes at solid surfaces will be discussed and illustrated with experimental results. The goal of such investigation is to define various fundamental characteristics of an interfacial electrochemical process: elemental composition; valency; molecular constitution; local conformation and structure; long-range order; reaction energetics and kinetics; spectroscopic properties; and the role of fundamental interfacial properties in practical situations. Entities of importance in such investigations include: anions and neutral atoms; electrodeposited metals and other deposits; aromatic hydrocarbons and derivatives; heteroaromatics; solvents; surfactants; and surface-modification agents. Methods of investigation include: conventional electrochemical methods combined with structure probes based upon electron impact, electron tunneling and x-ray scattering; elemental analysis by Auger and photoelectron spectroscopy; molecular vibrational probes such as infrared reflection and electron energy loss; and dynamics probes such as voltammetry, chronoamperometry and thermal desorption.