

Investigating Surfaces by Complimentary Chemical Spectroscopies

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Use of complimentary analytical techniques have been the standard for surface and interface analysis for some time. The availability of techniques that can collect data from nanoscale films, as well as user facilities which provide access to synchrotron and other advanced spectroscopic techniques which are beyond the developmental capabilities of individual users, have over the past few decades enabled clarification of surface chemistry and mechanisms in corrosion, coatings, energy and environmental interactions. Combined with synthesis and modeling, characterization methods such as XPS, EXAFS, SIMS, vibrational spectroscopies and chemical mapping have allowed the design of incredibly useful experiments to explore surface and interfacial phenomena which govern the properties and performance of modern engineering materials.

In this talk we will discuss some key examples from corrosion, surface science and nanotechnology, and discuss how the methodology of combining complimentary chemical spectroscopies, advanced imaging and synthesis are informing the design of next-generation, high performance materials and structures. In addition, we will discuss how emerging analytical techniques are continuing to push the envelope of what is possible in understanding surfaces.