Spreading the Knowledge

ASTM Committee E42 on Surface Analysis Contributes to EMSL Website

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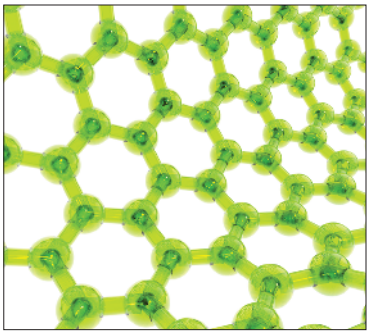

Surfaces and buried layers or interfaces in engineered and natural materials control many important material properties. These interfaces determine if a material, such as those used in airplane wings, will crack or remain durable. Surface analysis tools, which can characterize the outermost atomic layers, internal layers and multilayered thin films, are utilized to determine compositions and chemistries of devices.

Established in 1976, ASTM International Committee E42 on Surface Analysis works to advance the concepts and analysis approaches that have significantly improved the ability to obtain accurate reproducible and quantitative analysis of surfaces.

E42 has partnered with the U.S. Environmental Molecular Sciences Laboratory to create a website (www.emsl.pnnl.gov/capabilities/spectroscopy/surface_analysis) that provides convenient access to a range of resources and tools that improve the quality of surface analysis. The EMSL's mission to provide integrated experimental and computational resources for discovery and technological innovation in the environmental sciences to support the needs of the U.S. Department of Energy and the nation is a natural fit for Committee E42.

Designed to assist those who work regularly with surface analysis in finding current best practice information and materials that enable state of the art analysis of surfaces, the website compiles E42, EMSL, ISO and other surface analysis information into seven categories:

- ***Reference documents.*** Identify the status, needs and opportunities for improvement of surface analysis or surface analysis methods.
- ***Guides to surface analysis methods.*** Information on X-ray photoemission spectroscopy, auger electron spectroscopy, secondary ion mass spectrometry and others.
- ***Data useful for surface analysis.*** Information on sputter rates, binding energies and more.
- ***Standards and recommended practices.*** Information on ASTM International standards for sample handling, spectrometer calibration, data reporting and other subjects covered by E42 standards.
- ***Reference materials.*** Resources covering various aspects of surface analysis such as films to use as sputter rate standards.
- ***Specialized software***. Used for quantitative surface analysis.
- ***Vocabulary for surface analysis.*** Access to ISO 18115-1, Surface Chemical Analysis-Vocabulary-Part 1: General Terms and Terms Used in Spectroscopy; and ISO18115-2: 2010, Surface Chemical Analysis-Vocabulary-Part 2: Terms Used in Scanning-Probe Microscopy. E42 holds the U.S. TAG to ISO TC201, Surface Chemical Analysis; TC112, Vacuum Technology; and TC202 MicroBeam Analysis.

"Surface analysis methods are of increasing importance in several areas of technology, including the semiconductor, magnetic-storage and photovoltaic technologies and in predicting behaviors of implant materials, anti-corrosion coatings and advanced catalysts," says Donald R. Baer, laboratory fellow and lead scientist of interfacial chemistry, EMSL, and longtime E42 member.

Baer encourages all interested parties to join the activities of E42. "We are now working on guidance for specific areas of application, such as nanomaterials, corrosion and adhesion," says Baer. "If someone would like to have a protocol for their area of application, we would love to talk to them." E42 will be holding its next meeting Oct. 27-29 in conjunction with the AVS 60th International Symposium and Exhibition.

The Environmental Molecular Sciences Laboratory is a DOE national scientific user facility, supported by the DOE Office of Biological and Environmental Research, founded in 1997 at Pacific Northwest National Laboratory in Richland, Wash.