In-situ Electron Microscopy: Capabilities and Applications

11th of February 2020

National Electron Microscopy Centre, University Complutense of Madrid

Faculty of Chemistry, Av. Complutense, 28040 Madrid

Description:

TEM in-situ gas and liquid experiments

Researchers nowadays can better understand material's behavior by analyzing samples in real-world gas or liquid environments, at high temperature and with ultra-low noise electrochemical and electrical biasing techniques. With the new in situ tools, materials research occurs in highly controlled environments at high resolution without sacrificing the analytical capabilities of the TEM such as EDS. Applications for these tools include heterogeneous catalyst reactions, imaging of living cells, nanostructure nucleation and growth, battery and fuel cell materials, high temperature nanoparticle behavior, soft materials, and semiconductor devices..

Nanoprobing in SEM

A simple task in the world of electronics is the measurement of an I-V curve of a single transistor. However, if the size of the transistor is reduced to a few tens of nanometers or less, this task becomes very challenging. Probing on small structures requires a nanoprober with high positioning accuracy and very stable positioners as well as a high resolution imaging technique like SEM.

Tensile and bending probe testing with SEM imaging

Static or dynamic observations of surface changes under controlled mechanical load, crack growth, delamination phenomena, formation of slip planes etc. are possible, introducing a tensile or bending module into an SEM microscope. Metals, ceramics, glass, ceramic bulk materials or layers, galvanic coatings, soldered or welded joints, minerals, wood or organic materials are some of the different type of samples that can be tested.

Correlative light and electron microscopy (CLEM)

The combination of the labelling power of fluorescence imaging and the high resolution structural information provided by electron microscopy makes correlative microscopy the perfect tool for studying the complex relation between form and function in biology. In the other hand the power of cathodoluminescence imaging is that it combines functional optical information with the superior spatial resolution associated with electron microscopy. This makes the technique highly appealing for a large variety of applications and research, especially in the fields of optics research, materials science, and geology.

Tricks and Tips on Sample preparation

In this section we will present some of the latest developments related to sample preparation for scanning and transmission electron microscopy

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Agenda:

Tuesday, February 11h

9:00 - 9:15	Welcome
9:15 - 10:00	In situ Gas Reactions in TEM
10:00 - 10:30	Sample preparation and dry or wet in-situ electrochemistry in TEM
10:30 - 11:00	Coffee brake
11:00 - 11:45	Nanoprobing in SEM
11:45 - 12:30	Mechanical properties on the macroscale with SEM imaging
12:30 - 13.15	Correlative light and electron microscopy
13:15 - 13:45	Sample preparation for SEM and TEM applications
13:45 - 14:45	Lunch Break
14.45 - 17.00	Live demo of in situ Heating and Electrical Characterization in TEM Sample loading Heating + Electrical characterization + EDS compatibility

Address:
"Sala de Grados de la Facultad de CC. Químicas (antigua capilla)"
University Complutense of Madrid
Faculty of Chemistry

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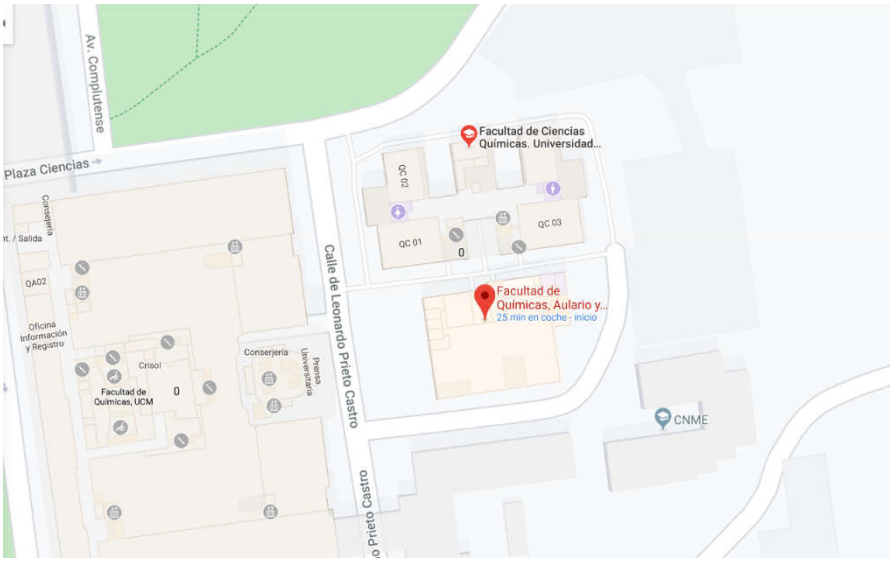

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For Registration please use the following link:

Register