Identifying Graphene by counting atomic layers

Researchers from the Centro de AstroBiología and Instituto de Ciencia de Materiales de Madrid studied the reactivity of different graphene types by X-ray spectromicroscopy (XPEEM) at the CIRCE beamline. Samples were prepared in situ on silicon carbide substrates, monitoring the evolution of the Low Energy Electron Diffraction (LEED) pattern in the microscope during heating up to 1250 C.

Depending on the number of atomic carbon layers, the electron reflectivity in Low Energy Electron Microscopy (LEEM) has a distinct voltage dependence, as shown in the spectra below. Identifying graphene and different graphene-like materials, their reactivity can be selectively studied.
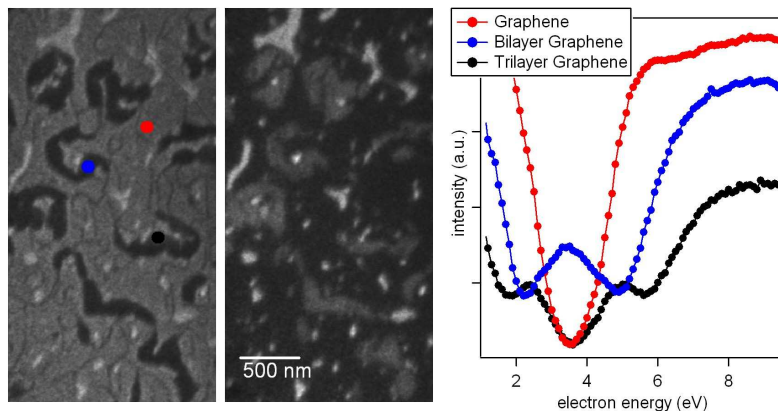
Left: electron reflectivity image at 2.4 eV energy. **Center:** electron reflectivity image of the same area at 3.4 eV energy. **Right:** reflectivity versus electron energy curves of the different areas (color markers in left image), showing quantum size oscillations. The number of minima is directly correlated with the number of atomic Graphene layers.