Maya Kiskinova Extended Abstract

An important prerequisite for understanding dimensionality dependent phenomena in nano-structured materials is exploiting their structure and composition at their natural length scales and working environment. The complementary capabilities of different photoelectron microscopes at Elettra in terms of imaging, spectroscopy, spatial and time resolution have opened unique opportunities to study the surface structural, electronic and transport properties of individual structures as a function of their size, morphology, gas environment and temperature [1]. The examples include several exemplary systems exploring (i) the effects of size, local structural organization, growth conditions and exposure to different ambient on the electronic structure and composition, (ii) electron confinement effects on the local chemical reactivity, (iii) lateral heterogeneity induced by surface reactions, (iv) degradation and mass transport processes in organic light devices and fuel cell. The limits in applications of the scanning and imaging x-ray photoelectron microscopes imposed by the operation principle or due to unforeseen or undesired events will be outlined and discussed.

[1] A. Barinov et al, Nucl. Instr.Meth.Phys.Res. A, **601** (2009) 195.