

# **SPECS: STATE-OF-THE-ART INSTRUMENTATIONS FOR NANOSTRUCTURE MATERIALS ANALYSIS**

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Nanotechnology deals with particles and structures smaller than 100 nm down to clusters only consisting of a couple of atoms. In this regime size effects and finally quantum size effects determine the properties of nanomaterials. To tailor nanomaterials the basic knowledge of these effects is crucial. While theoretical studies are widely used the application of experiments comes to the limit. Sensitivity, resolution, stability and the materials' environment in the working device are the limiting factors for many chemical, electronic and structural sensitive methods. During the last twenty years special techniques

have been developed to study such materials with highest lateral resolution (e.g. low energy electron microscopy (LEEM), photoelectron emission microscopy (PEEM), different scanning probe microscopies (NC-AFM, STM)), as well as *in situ* methods in high pressures (high pressure photoelectron spectroscopy HP-PES and HP-SPM), in liquids, at extremely high and extremely low temperatures. This presentation gives an overview of the most promising existing methods and their commercially available realizations, summarizing chances and limitations for future developments from the perspective of a supplier of scientific instruments.