

# Development of environmental tomography for sensitive nanomaterials in wet-STEM

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ESEM (Environmental Scanning Electron Microscopy) allows the observation of materials under controlled relative humidity due to the presence of the gaseous environment and the control of the sample temperature. Under specific conditions of pressure and temperature, the observation of nano-objects in a liquid is made possible in the transmission mode, with images quite similar to those obtained in Transmission Electron Microscopy using a closed cell. The specificity of ESEM lies in the fact that hydration and de-hydration cycles can be carried out by varying the environmental pressure. In parallel, a device has been developed for the characterization of the 3D structure of non-conductive and low-contrast materials. Very recently, it has been shown that image series of samples before and after *in situ* condensation of water can be achieved with the implementation of a Peltier stage in the tomographic sample holder.

In this work, we will present some improvements on the wet-STEM device, who now permits to characterize liquid suspensions. For that purpose, it is necessary to get an accurate measurement of the sample temperature for a better control of the process of water evaporation or condensation. We will show the example of a SBA (styrene butyl acrylate) latex, including a charged stabilizer (3%wt PMMA), which morphology is highly dependent on the water content.