

Nanoscale analytical characterization of radiation damage

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In order to better understand radiation damage in nuclear reactors, we need to understand the advantages and limitations of the characterization techniques available. This is crucial, since the changes we'll try to observe are often minimal or confined to very small volumes. In this talk we will focus on the analytical techniques available in the transmission electron microscope (TEM): Energy dispersive X-ray spectroscopy (EDS) and Electron energy loss spectroscopy (EELS). The basics of both techniques will be covered, as well as their main issues when it comes to quantification. Some novel approaches to improve the accuracy and detectability limits of both techniques will be presented, including multivariate statistical analysis, experimental determination of cross-sections and quantification through model/curve fitting.