Report on ES-251 experiment

Using the micro-XANES station at BM23, we have recorded Zr K-edge spectra on synthetic and natural samples. Synthetic samples had been prepared in our laboratory at high pressure (5 GPa) and high temperature (ca. 2100 K), and under controlled oxygen fugacities (log($fO_2$) from IW-1 to IW-7.9, IW referring to the oxygen fugacity buffered by the Fe-FeO equilibrium). Natural terrestrial material consisted zircon ($ZrSiO_4$) of various ages and geographical origin (Alps, Kerguelen Archipelago, Venezuela). We also studied extraterrestrial material including silicate and sulfides from enstatite chondrites (the most reduced chondrite group) and silicate minerals from primitive achondrites (Acapulco and Lodran). In order to calibrate the position of the white line as a function of valence state, we also analyzed Zr metal foil, as well as synthetic compounds such as $ZrO_2$, $ZrSi_2$.