

High pressure CuBe cell for small and wide-angle x-ray scattering

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A new B_4C anvil cell have been developed and tested by UFES, IPEN, IAE-CTA and LNLS since 2004. This CuBe pressure cell has been used to study X-ray diffraction patterns behavior of materials under hydrostatic pressure. Moreover, the CuBe pressure cell can also be used to investigate biological system as lipid-water dispersions without changes in its design. The B_4C anvil is transparent for enery higher than 7500eV, which allows investigations on L_{III} rhenium edge. In order to measure the pressure inner the gasket hole, we have investigated the effect of the hydrostatic pressure on the ReO_2 monoclinic using X-ray diffraction and XANES under hydrostatic pressure up to 1.8 GPa. The X-ray transparence of the B_4C anvil above 7.5keV has allowed the rhenium XANES signal investigations without anvil interference. However, for the X-ray diffraction spectrum of the B_4C it was noted that the pattern had a shifth as a pressure function. In order to check the inner pressure a magnetic transition of $La_{0.85}Sr_{0.15}MnO_3$ and a octahedral distortion of the ReO_3 were used as second inner pressure gauge. $La_{0.85}Sr_{0.15}MnO_3$ and ReO_3 had confirmed the pressure in the cell for XANES experiments under hydrostatic pressure measurements. For X-ray diffraction experiments the ReO_2 monoclinic was revealed to be a good inner pressure gauge.