

ReO₂ as a inner pressure gauge used in X-ray diffraction under external pressure up to 1.8 GPa

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A new B4C anvil CuBe cell pressure have been developed to DXAS (Dispersive X-ray Absorption Spectroscopy) beam line experiments since 2004 by our research group. ReO₂ XAS (X-ray Absorption Spectroscopy) under hydrostatic pressure up to 1.6 GPa was measured at Laboratório Nacional de Luz Sincrotron; at Campinas, São Paulo, Brazil; LNLS - DXAS beam line. This pressure cell can be applied to investigate solid samples behavior under external hydrostatic pressure. Moreover, it might also be used to investigate biological system as lipid-water dispersions without changes in its design.

The ReO₂ oxide in your monoclinic structure has presented a change in the EXAFS (Extended X - Ray Absorption Fine Structure) signal as a function of applied external hydrostatic pressure.

The ReO₂ powder diffraction pattern has shown a clear reduction of the area peak at 19.8 deg (10.600 keV) as the external hydrostatic pressure is increased. The dependence of this diffraction peak area as an inner hydrostatic pressure can qualify the ReO₂ as a pressure gauge.

In order to compare the ReO₂ pressure gauge results, it was measured the magnetic susceptibility variation of a La(0.85)Sr(0.15)MnO₃ sample at same pressure setup and same time. The results are in agreement with obtained in the standard piston pressure cell.