

## **XAS and XRD: Complementary Tools to Explore Matter under Extreme Pressure**

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The study of matter under extreme conditions introduces strong experimental constraints that, in many cases, asks for the use of complementary techniques for structural characterization. These constraints can include the presence of a complex sample environment with different absorbing and/or scattering elements, a reduced k-space domain or the presence of non isotropic constraints.

I will present here a condensed review of examples where the successful combination of X-ray absorption spectroscopy and X-ray diffraction has contributed to the understanding of the structure and physical properties of matter under extreme conditions of pressure and/or temperature.

Emphasis will be given to those cases where the actual local structure is different from that obtained from the long range order structural analysis and/or when crystallography does not succeed in getting the full structure of a system.

Examples will range from simple molecular crystals with only 4 atoms in the unit cell to the silicon clathrate case with more than fifty atoms in the Bravais lattice. The study of the local compressibility combining both techniques constitutes a further example of the complementarity of both techniques that will be illustrated in the case of pseudobinary alloys and lamellar systems.

**Keywords: high pressure research, absorption spectroscopy experimental, high-pressure x-ray diffraction**