

A C-BN compound Heating Cell for In Situ Transmittance and Fluorescence X-ray Absorption Spectroscopy Investigations

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X-ray absorption spectroscopy (XAS) is a powerful method for local geometric and electronic characterization in crystalline compounds, amorphous substances, glasses and liquids. In situ high-temperature XAS measurements are of fundamental interest for a detailed understanding of temperature-dependent structures in phase-change materials. A C-BN compound heating cell has been designed for in situ transmittance X-ray absorption spectroscopy measurements up to 1073K under vacuum or an inert atmosphere. These high temperatures are achieved using C-BN compound heating elements by ohmic heating. Because of the small specific heat capacity, the temperature can be changed in a matter of minutes from room temperature to high temperature. Furthermore, a commercial power controller was adapted to provide stable temperature control. The construction of the heat shielding system provides a novel approach to reducing the beam's path-length and the cell's size. The cell is inexpensive and easy to build.