

Large volume press synchrotron experiments at high pressure high temperature

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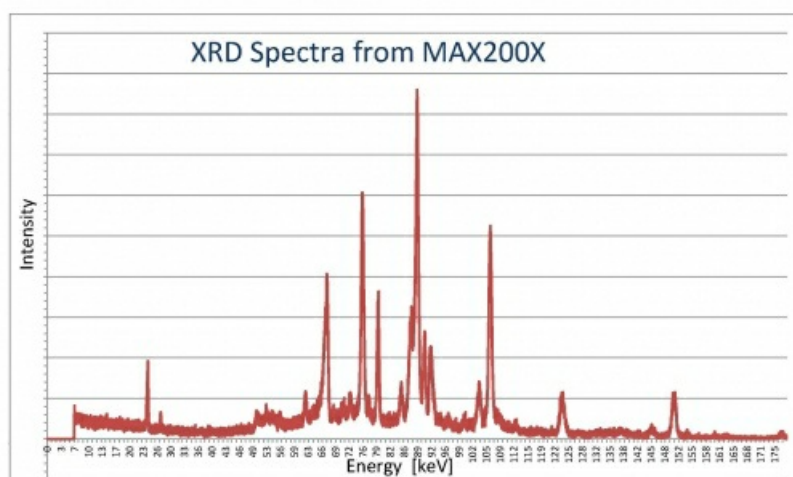
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High pressure, high temperature measurements with relatively large volume compared to diamond anvil cell are very important for geoscientists, material scientists, physicists and chemists. It is essential if there is a need for some amount of sample for other characterization.

It is necessary to use in-situ X-ray diffraction experiments at synchrotron beamlines because of the high intensity and the broad energy range to figure out the stability of minerals under high pressure and temperature, the determination of bulk moduli, the thermal expansion, phase diagrams, and the behavior of kinetic measurements.

Energy-dispersive X-ray diffraction was used to determine the pressure and temperature induced volume change. Isothermal experiments were X-ray studies at high pressure; high temperatures in a large volume press can only be carried out at the Synchrotron. For Earth scientist the goal of such studies to simulate in Laboratory conditions like in the interior of our planet to measure precise determination of lattice constants at different pressures, dynamical observations of phase transitions, melting points, viscosities and many other things.

The Large Volume Press was located at the Hamburger Synchrotron Laboratory (HASYLAB) at the DORIS III storage ring. MAX200x is a high pressure multi anvil device. It was a hard-wiggler beamline with a critical energy of 26.4 keV and an energy range up to 175 keV.



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