

## In situ x-ray diffraction of hydrous magnesium silicate under high pressure and high temperature

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Water has a significant effect on the melting temperature and the melt composition of the Earth's mantle minerals. The mantle composition is simplified in the system MgO-SiO<sub>2</sub>, and it is important to clarify the melting relation with and without water. In our previous study (Inoue 1994), the melting temperature and the melt composition were clarified in the system Mg<sub>2</sub>SiO<sub>4</sub> (forsterite), MgSiO<sub>3</sub> (enstatite) and Mg<sub>2</sub>SiO<sub>4</sub>-MgSiO<sub>3</sub> eutectic under hydrous condition. We found that the melt composition drastically change with increasing pressure compared to that in anhydrous condition, in addition to the abrupt decrease of melting temperature. The Mg/Si of the generated melt has less than 1 below 5 GPa, whereas Mg/Si is between 1 and 2 in the range 5-7 GPa, still more 2 above 7 GPa. To understand the reason of the above results, it is important to clarify the microscopic melt structure under high pressure and high temperature. The hydrous melt is unquenchable, so high-pressure in situ x-ray study is an only way to clarify the above phenomena.