

## High pressure phase relations of hydrous MORB and hydrous Harzburgite in the mantle transition zone

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Oceanic plate (slab) is subducting into Earth's deep interior and it is stagnant around the mantle transition zone, which is confirmed by seismic tomographic image. Slab is believed to consist of three different compositional layers by MORB, harzburgite and lherzolite. So the phase relations of these compositional rocks have been clarified so far together with the determination of the physical property and so on at high pressure and temperature. On the other hand, subducting slab can transport water in to the Earth's deep interior because of the pressure of hydrous minerals. Therefore it is important to study the effect of water for the subducting slab materials. In this study the phase relations for hydrous MORB and hydrous harzburgite have been studied in the condition corresponding to the mantle transition zone.

The high pressure experiments were conducted at pressure of 15 to 23 GPa and temperature of 1400 and 1600 deg C using MA8-type (Kawai-type) multi-anvil apparatus. Garnet and stishovite were stable at 15 to 22 GPa in MORB composition. However, over 23GPa, garnet transformed to Ca-perovskite, Mg-perovskite and calcium-ferrite. On the other hand in harzburgite composition, wadsleyite transformed to ringwoodite at around 18 GPa, and the post spinel transformation was observed at around 23 GPa. Moreover akimotoite was stable at 15 to 21 GPa.

On the dry MORB, garnet transformed gradually 25 to 30GPa. But in the hydrous MORB, garnet transformed sharply at around 22 to 23 GPa. On the harzburgite composition, garnet is stable at the mantle transition zone in dry condition. However in hydrous condition, akimotoite was stable. Thus water affects the phase transformation boundaries and the phase assemblies remarkably. As the results, the density profiles of the subducting slab should change in dry and hydrous cases, and should be important for mantle dynamics.

Keywords: high pressure phase relation, hydrous MORB, hydrous Harzburgite, the mantle transition zone