

Experimental constraints on garnet-olivine reactions under upper mantle conditions-Does spinel-pyroxene symplectite form?-

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Symplectites in the Horoman peridotites (spinel-lherzolite) consist of orthopyroxene, clinopyroxene and spinel, and are thought to be the subsolidus reaction product after garnet with addition of olivine component during decompression of the complex from the garnet-lherzolite stability conditions (Kushiro & Yoder, 1966; Takahashi & Arai, 1989; Ozawa & Takahashi, 1995; Morishita & Arai, 2003) Crystallographic analysis using FE-SEM-EBSD revealed that symplectite minerals have systematic crystallographic relationship among constituent minerals (Odashima et al., 2008). The mechanisms for the formation of symplectite texture remain unclear. New experiments have been specially designed to investigate garnet-olivine reactions under spinel lherzolite stability conditions. In the experiments, a cubic-shaped single garnet grain (0.8 mm x 0.8 mm x 0.8 mm in size) from the Western Gneiss Region of Norway was surrounded by powder of San Carlos olivine and the sample assemblies were heated and pressurized. Experiments were carried out using a multi-anvil set, MAX90 (Kyushu University). Here we report various textures formed under both supersolidus and subsolidus conditions.