

# Geodynamics Seminar

## 第363回ジオダイナミクスセミナー

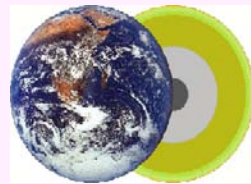
### The synthesis and characterization of $\text{Mj}_{80}\text{Py}_{20}$ and $\text{Mj}_{59}\text{Py}_{41}$ garnet along the Majorite-Pyrope join

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主催: 愛媛大学地球深部ダイナミクス研究センター

日時: 7/12(金) 午後 4時30分～

場所: 総合研究棟 4F 会議室



#### Abstract

Majorite garnet is a key mineral phase in the transition zone of the Earth's mantle. It occurs by the dissolution of upper-mantle pyroxenes into the garnet structure at pressure and temperature conditions of lower upper mantle and transition zone. At these pressure and temperature, the garnet component makes up about 40% by volume for peridotitic compositions and as much as 60% for basaltic compositions. These garnets, which can be approximated by the system majorite – pyrope, will thus contribute significantly to interpret of seismic models of the transition zone, in which the velocity gradients with depth are remarkably high.

Therefore, in this study,  $\text{Mj}_{80}\text{Py}_{20}$  (tetragonal,  $I4_1/a$ ) and  $\text{Mj}_{59}\text{Py}_{41}$  (cubic, ) were synthesized at 19 GPa and 1700°C for 2 hours using multianvil ORANGE-3000 . The recovered samples were nearly cylindrical in shape and translucent and confirmed by X-ray diffraction to be single-phased garnet structure. The average grain size in the polycrystals is about 1~2  $\mu\text{m}$ . Bulk density was determined by Archimedes' method using toluene as the immersion fluid, both of which are 99.8% of theoretical X-ray densities. The finished samples ready for ultrasonic measurements were single-phase, free of microcracks, fine-grained size ( $\leq 5 \mu\text{m}$ ) and about 1.9 mm in diameter and 1.5 and 1.2 mm in length, respectively. In near future, we will further study the sound velocity on both polycrystal samples and then to discuss seismic structure in mantle transition zone.