

# Report for the Joint Use/Research of the Institute for Planetary Materials, Okayama University

**2019 fiscal year first term / second term / others**

26/01/2020

**Category:** **International Joint Research**/ General Joint Research/ Joint Use of Facility/ Workshop

**Name of the research project:** Synthesis and characterization of water-bearing single-crystal bridgmanite

**Principal applicant:** Jung-Fu Lin

**Affiliated institution and department:** Department of Geological Sciences, The University of Texas at Austin

## **Collaborator**

**Name:** Takuo Okuchi

**Affiliated institution and department:** Institute for Planetary Materials, University of Okayama at Misasa

## **Research report:**

In this research project, we had synthesized single-crystal bridgmanite using 5000-ton Kawai Apparatus at the Institute for Planetary Materials, University of Okayama at Misasa. This was an international joint-use project via collaboration with Prof. Okuchi and Dr. Purejev. The crystals were synthesized using slow-growth method that Prof. Okuchi and colleagues had developed at the Institute. These crystals are among the highest quality bridgmanite crystals available in the world. I have been using these crystals to study their elasticity ( $C_{ij}$ ), transport properties (thermal conductivity and electrical conductivity), and water contents recently. Our latest study published in GRL (Fu et al., GRL, 2019) showed that bridgmanite can contain about 1000 ppm of water. This amount of water in bridgmanite is much higher than previously thought—previously most people think that the lower mantle is dry. The direct implication of the high water solubility is on the water transportation induced partial melting especially at the topmost lower mantle.

- 1) Please write the research report with free format, but include followings: research purpose, actually conducted research, and research outcomes. If necessary, you can add another pages.
- 2) For the workshop, please write the report for the workshop. Also, attach the program, abstracts, and list of the participants etc.
- 3) Please add Collaborator's Name, Affiliated institution and department as needed.