

Report for the Joint Use/Research of the Institute for Planetary Materials, Okayama University for FY2024

06/02/2025

Category: ☒ International Joint Research ☐ General Joint Research ☐ Joint Use of Facility
☐ Workshop

Name of the research project: Thermal conductivity of hydrous minerals in deep Earth

Principal applicant: Wen-Pin Hsieh

Affiliated institution and department: Institute of Earth Sciences, Academia Sinica

Collaborator

Name: Takayuki Ishii

Affiliated institution and department: IPM

Research report:

- 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 page.
- 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.
- 4) Please answer the question on the next page.

Our goal for this collaborative study is to precisely measure the thermal conductivity of minerals in the oceanic crust, such as hydrous aluminous silica and calcium ferrite type phase at relevant pressure-temperature conditions in a subducting slab down to Earth's deep mantle. My collaborator, Dr. Takayuki Ishii, has used the state-of-the-art large volume presses in IPM to synthesize high-quality crystals. My group has used an optical pump-probe method to pin down their thermal conductivity at high pressure-temperature conditions. We have published our work in:

Wen-Pin Hsieh*, Takayuki Ishii, Frédéric Deschamps, Yi-Chi Tsao, Jen-Wei Chang, and Giacomo Criniti, "Reduced thermal conductivity of hydrous aluminous silica and calcium ferrite-type phase promote water transportation to Earth's deep mantle," *J. Geophys. Res. Solid Earth*, **130**, e2024JB030704 (2025).