

**Report for the Joint Use/Research of the Institute for Planetary Materials,  
Okayama University for FY2023**

5/29/2024

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

**Name of the research project:** Synthesis of fluorine-doped hydrous minerals

**Principal applicant:** Xuejing He

**Affiliated institution and department:** Geochemical Research Center, Graduate School of Science,  
The University of Tokyo

**Collaborator**

**Name:** Youyue Zhang, Takashi Yoshino, Hiroyuki Kagi

**Affiliated institution and department:** IPM, IPM, UTokyo

**Research report:**

The initial purpose of this project was to synthesize F-doped phase E. The starting materials were a mixture of  $\text{Mg}(\text{OH})_2$ ,  $\text{MgF}_2$ , and  $\text{SiO}_2$ . High-pressure and high-temperature experiments were performed using the KAWAI-type multi-anvil high-pressure apparatus, USSA-1000, installed in the IPM. In experiments performed at 15 GPa, 1100 °C, instead of phase E, humite group minerals were produced. The project was then changed into synthesizing Fe-doped phase E using starting materials of  $\text{Mg}(\text{OH})_2$ ,  $\text{SiO}_2$  and  $\text{Fe}_2\text{O}_3$ . Experiments were carried out 15 GPa, 1100 °C. Phase E and Fe-doped phase E were obtained. The obtained phases were characterized by single-crystal XRD, Raman spectroscopy, and IR spectroscopy at the Geochemical Research Center, Graduate School of Science, The University of Tokyo.