

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

05/26/2025

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

**Name of the research project:** High-pressure generation in large-volume press by using sintered gradia anvils

**Principal applicant:** Shuangmeng Zhai

**Affiliated institution and department:** Institute of Geochemistry, CAS

## **Collaborator**

**Name:** Daisuke Yamazaki

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

## **Research report:**

The research purpose is to develop pressure generation using 14-mm sintered gradia anvils with the help from Prof. Yamazaki at IPM, and do some test experiments under high-pressure and high-temperature conditions.

We did a test experiment in a 4/1 cell assembly with GaP as the pressure calibrant in AMAGAEL press. Unfortunately, blow-out happened at an oil press of 141 ton. I only have two set of these 14-mm sintered gradia anvils which would be used in the coming beamtime of SPring-8. In order avoid any further damage of the anvils, we stopped the testing experiments.

On the other hand, a few synthetic experiments were carried out by using normal WC anvils in USSA-5000 press. Single crystals of high-pressure phases for  $\text{Sc}_2\text{Si}_2\text{O}_7$ ,  $\text{Sc}_2\text{SiO}_5$ , and  $\text{MgP}_2\text{O}_6$  were obtained. Their crystal structures will be determined by single-crystal X-ray diffraction method.