

## **Abstract**

To precisely determine physical properties of Earth's material, high-quality single crystals of high-pressure minerals are essential. A new method, called "dual-heating method", to synthesize large single crystals at high pressures is developed in this study. In this method, I put two independent heaters in the cell, and modulate electrical powers supplied to the each heaters in antiphase.

Under 10 GPa and 1000 °C, graphite could be used as a heater. A Ta heater can be used above 10 GPa and 1000 °C. Also, the movement of liquids according to the temperature gradient is confirmed.

I demonstrated single crystal synthesis of SiO<sub>2</sub> stishovite. Reagent grade of silicic acid is used as starting material, which is mixed with water as a flux. At 14GPa and temperatures cooled down from 1,200 °C to 800 °C, 10% modulation amplitude and 10min modulation period, single crystals of stishovite exceeding 0.5mm are grown.