

DTAによる高圧鉱物の融解実験
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Melting of portlandite up to 6 GPa

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Using the high-pressure differential thermal analysis (HP-DTA) system in a cubic multianvil high-pressure apparatus, we measured the melting points of portlandite, $\text{Ca}(\text{OH})_2$, up to 6 GPa and 1000 °C. We detected endothermic behavior at the temperature and pressure conditions of 800 °C and 2.5 GPa, 769 °C and 3.5 GPa, 752 °C and 4.0 GPa, 686 °C and 5.0 GPa, and 596 °C and 6.0 GPa, respectively, due to melting of portlandite. By in situ X-ray studies under pressure, the melting of portlandite was observed at 730 °C and 4.32 GPa and at 640 °C and 5.81 GPa, respectively. Results of both HP-DTA and X-ray studies were consistent within experimental error. The melting is congruent and has a negative Clapeyron slope, indicating that liquid $\text{Ca}(\text{OH})_2$ has higher densities than crystalline portlandite in this pressure range.