

The 11th Global-COE International Frontier Seminar

August 24th, 2009, from 17:00, at the room# 486 meeting room 4F

Pressure generation and investigation of the post-perovskite transformation in MgGeO₃ by squeezing the Kawai-cell equipped with sintered diamond anvils

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We have tried pressure generation by squeezing the Kawai-cell equipped with sintered diamond (SD) anvils in the DIA-type press. SD cubes with an edge length of 14 mm and truncated corner of 1.5 or 1.0 mm are adopted. Experiments have been conducted by means of in situ X-ray observation using synchrotron radiation at SPring-8. The maximum attainable pressure has reached 90.4 GPa at 300 K based on the Anderson et al.'s (1989) Au scale.

Simultaneously, we investigated the perovskite (Pv)–postperovskite (PPv) transformation in MgGeO₃, an analog of MgSiO₃, up to ca. 74 GPa and 2200 K. Major purpose of the study was to determine the Clapeyron slope which is crucial information in discussing the constitution of the D'' layer. Transformation from Pv to PPv was observed at higher than 63 GPa and 1300 K. Both the forward and the reverse reactions were found to be fairly sluggish over the examined temperature range. We determined the phase boundary by passing through the conditions at which either Pv or PPv phase grew and that of coexistence of both the phases, which is expressed by a equation $T(K) = 191.2 P(GPa) - 10563$. Our dP/dT slope of 5 MPa/K for MgGeO₃ is close to the minimum estimate for MgSiO₃ and accordingly suggests relatively deeper D'' discontinuity and a high heat flux from the core. We show how the phase boundary relies on the pressure scale adopted.

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Room 486, meeting room 4F
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