The 389th Geodynamics Seminar

Elastic wave velocity of polycrystalline $Mj_{80}Py_{20}$ majorite to the mantle transition zone conditions

Zhaodong Liu (Ph.D. student, Ehime University)

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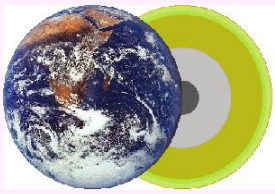

EHIME UNIVERSITY GRC GEODYNAMICS RESEARCH CENTER

Abstract

Laboratory sound velocity measurements on the majorite at high pressures and high temperatures provides the significant information in interpreting the seismological models for the mantle transition zone in the Earth's interior. The elastic wave velocity of the majorite with a pyrolite minus olivine composition, reported by Irifune et al. (2008), has well modeled the velocity profile in pyrolite composition at the mantle transition zone. The majorite at the mantle transition zone can be approximated by the simplified system majorite ($Mg_4Si_4O_{12}$) – pyrope ($Mg_3Al_2Si_3O_{12}$), and its elastic properties will thus contribute significantly to interpret of the seismic models for the transition zone. The earlier sound velocity studies on this solid join were limited to the low pressures and temperatures, and also produced some discrepancies in the elastic properties, which has impeded to interpret the seismic velocity profile of the mantle transition zone.

Here we performed *in situ* X-ray and ultrasonic measurements on a majorite composition in the majorite-pyrope join under the pressure and temperature conditions of the mantle transition zone in a Kawai-type multi-anvil apparatus. The elastic moduli and their pressure and temperature derivatives are determined from the current experimental data. The newly obtained results are compared with those from the previous studies on other majorite garnets with varying composition in the majorite-pyrope join. We also discuss briefly the implications of this study for the interpretation of the seismic velocity models at the mantle transition zone.

詳細は当センターホームページ：http://www.ehime-u.ac.jp/~grc/をご覧ください
問い合わせ先：出倉 春彦（TEL:089-927-8408, e-mail:dekura@sci.ehime-u.ac.jp）