Geodynamics Seminar

第327回ジオダイナミクスセミナー

Water Weakening of Wadsleyite: Implication for Viscosity at 410-500 km Depth

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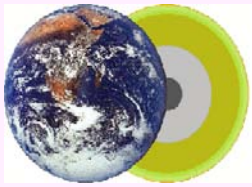
主催：愛媛大学地球深部ダイナミクス研究センター
日時：4/27（金）午後 4時30分～
場所：総合研究棟 4F 会議室



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Abstract

Viscosity of wadsleyite in the upper part of the Earth's mantle transition zone (between 410 and 500 km depth) plays a key role in dynamics of the mantle transition zone. Incorporation of water into minerals substantially reduces viscosity of the minerals (e.g., quartz, olivine and garnet), and this phenomenon has been known as water weakening (or hydroxyl weakening). Effect of water on wadsleyite viscosity may be significant because of high water solubility in wadsleyite (~3 wt %), however, it remains uncertain due to experimental limitations. In order to evaluate the water effect on the wadsleyite viscosity, we performed *in situ* creep strength measurement on wadsleyite aggregate under hydrous condition at high pressures and high temperatures using a deformation-DIA apparatus in conjunction with synchrotron X-ray radiation. The creep strength measurement on hydrous wadsleyite revealed that water in wadsleyite significantly reduced the wadsleyite creep strength at 14 GPa and 1700 K and water dependence of its creep strength was larger than that of olivine. The experimental result indicates that mantle viscosity abruptly decreases by a few orders of magnitude across 410-km seismic discontinuity and heterogeneity of water in the mantle transition zone leads notable viscosity heterogeneity.

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
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