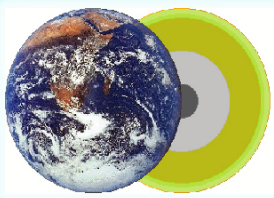
The 448th Geodynamics Seminar

High-pressure generation in Kawai-type multianvil apparatus equipped with nano-polycrystalline diamond anvils

Dr. Takehiro Kunimoto (WPI Postdoctoral Research Technician)

Date: 22 July (Fri.) 2016, 16:30 ~
Venue: Meeting Room #486, Science Research Bldg. 1, Ehime Univ.

日時：2016年7月22日(金)16:30～
場所：愛媛大学 総合研究棟Ⅰ 4階共通会議室



EHIME UNIVERSITY GRC GEODYNAMICS RESEARCH CENTER

Abstract

High-pressure technologies are successfully applied to several scientific fields including geoscience. In the case of study of the Earth's interior, attainable high-pressure conditions are restricted by the potential of adopted high-pressure devices. Several high-pressure devices have been used to high-pressure studies. Among these, Kawai-type multianvil apparatus (KMA) and diamond anvil cell (DAC) have been widely used as devices to study of the Earth's interior. KMA has advantage in producing homogeneous temperature and pressure with larger sample volume compared with DAC, which makes it possible to measure accurate physical and chemical properties of minerals. The maximum pressure achieved by KMA has been limited to about 50 GPa when tungsten carbide (WC) is used for the second-stage anvil material (Kunimoto et al., 2016). However, in this decade, a remarkable improvement has been made for the KMA by adopting sintered diamond (SD) as a second stage anvil material and pressures up to about 100 GPa have been confirmed (Ito et al., 2010; Yamazaki et al., 2014). Irifune et al. (2003) and Sumiya and Irifune (2006) introduced a nano-polycrystalline diamond (NPD) as a newly developed super hard material. As you know, hardness of anvil material is important for higher-pressure generation using high-pressure devices. Additionally, we have recently succeeded in producing larger NPD rods of up to ~10 mm in both diameter and length, which are now easily processed with pulse laser (Isobe et al., 2010). Therefore, NPD can be a dominant candidate for a new anvil material. Then, we have been carried out some preliminary experiments for optimization of a cell assembly using KMA (MADONNA-II) with SD anvils at GRC. Moreover, we conducted *in situ* X-ray observations using KMA (SPEED-Mk.II installed at SPring-8, BL04B1) with NPD or SD anvils to confirm their ability as an anvil material. In this presentation I will report about the detail on performance test.

詳細は当センターホームページ: http://www.grc.ehime-u.ac.jp/をご覧ください
問い合わせ先: 西 真之 (TEL: 089 927 8153, e-mail: nishi@sci.ehime-u.ac.jp)