THE GEODYNAMICS SEMINAR № 545

**Dr. Takehiro Kunimoto**
Post-doctoral fellow
Geodynamics Research Center

**2021.02.26 (Fri.) 16:30 ~**

**Venue: Zoom**
A link will be sent @grc-all within 30 minutes before the beginning of the seminar.

# Application of nano-polycrystalline diamond to high pressure experiment using multianvil apparatus with 6-8-2 type system

The pressures available in Kawai-type multianvil apparatus (KMA), using second-stage anvils of tungsten carbide (WC) or sintered diamond (SD), have been limited to about 30 GPa and 60 GPa, respectively. Recent efforts in introductions of newly-developed WC and SD materials and improvements in cell assemblies significantly expanded these limits to 60 GPa for WC anvils and 120 GPa for SD anvils. An attempt has also been made to the harder nano-polycrystalline diamond (NPD) as the second-stage anvils demonstrated the potential importance of this noted ultra-hard material for KMA, but the available pressures have been limited to ~90 GPa because of the limitation in the size of NPD. Then, we introduced a cell assembly for 6-8-2 system with NPD, and reported generation of pressures up to 125 GPa, but it was difficult to produce further higher pressures. So, we have been trying to improve the cell assembly for the 6-8-2 system to generate the pressure equivalent to the Earth's core-mantle boundary, for better understanding of this heterogeneous region using advantages of KMA over competing diamond anvil cell.

Eventually, we reached pressures to 150 GPa, which are the highest pressure ever reported in KMA, although we were unable to identify the crystal structure of the sample due to amorphization. The pressure achieved in these runs completely cover the entire D" region, and some attempts have also been made to produce high temperatures under such pressures. Here, I will present a current status on our techniques and future perspectives.

**Keywords:**
1. 6-8-2 type multianvil system
2. nano-polycrystalline diamond