



Dr. Takeshi Sakai

Associate Professor
Geodynamics Research Center

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Venue: Zoom

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

High pressure generation over 4 megabar

High pressure generation above 400 GPa is not easy. Although the diamond anvil cell (DAC) with beveled anvils has been widely used for multi-megabar science, achievable pressure is limited up to about 400 GPa. Recently double-stage DAC (ds-DAC) and toroidal DAC (t-DAC) were developed to overcome the pressure limit. Some papers have succeeded to generate over 500 GPa, however, these techniques do not become a common experimental procedure yet due to some technical difficulties. The maximum experimental pressure depends on many parameters, such as an anvil's culet size, bevel angle/size, quality of diamond itself, etc... We have tried to optimize these parameters and to develop a new approach for both ds-DAC and t-DAC. For example, we developed a conical support type ds-DAC and succeeded in obtaining a clear XRD pattern in the 400 GPa region. In addition, the t-DAC experiment has succeeded to generate pressure up to about 450 GPa. At the same time, it is necessary to consider the pressure scale problem in the evaluation of the generated pressure. Here, we will introduce the recent progress of these technological development and discuss the results of compression experiment for about 7 metals using t-DAC technique up to around 400 GPa.

Keywords:

1. double-stage diamond anvil cell (ds-DAC)
2. toroidal diamond anvil cell (t-DAC)
3. Conical support