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### PREMIER RESEARCH INSTITUTE FOR ULTRAHIGH-PRESSURE SCIENCES (PRIUS) – A NEW NATIONAL JOINT USAGE / RESEARCH CENTER AT GRC, EHIME UNIVERSITY

The PRIUS, operated by the Geodynamics Research Center (GRC) at Ehime University, has been approved as a Joint Usage / Research Center by the Japanese Ministry of Education, Culture, Sports, Science, and Technology. The main purpose of PRIUS is to effectively utilize (1) advanced high-pressure apparatus and analytical instruments, (2) techniques of ultrahigh-pressure experiments and numerical calculations, and (3) ultrahard nanopolycrystalline diamond (NPD, HIME diamond) products at GRC via collaborative research to further develop ultrahigh-pressure research in mineral/materials sciences and related scientific fields. PRIUS is calling for the following types of collaborative research in the ultrahigh-pressure sciences and any related fields.

#### 1. Use of PRIUS facilities

This type of collaborative research project mainly utilizes research facilities at GRC, including high-pressure apparatus and analytical instruments, and some facilities in other institutions installed and run by GRC. The following experimental apparatus are applicable:

- Ultrahigh-pressure apparatus and related equipment, such as multianvil apparatus (Fig. 1) and diamond anvil cells
- Analytical instruments and processing equipment such as ATEM, FE-SEM, FIB, XRD
- Measuring instruments and ultrahigh-pressure apparatus at synchrotron radiation facilities



FIGURE 1 High-pressure apparatus at GRC

#### 2. Collaborative research

This is a collaborative research project without utilizing any GRC facilities (supplementary use of the facilities is applicable). The following are examples of the subject areas:

- Utilization of HIME diamond (Fig. 2)
- Theoretical simulations such as *ab initio* calculations and computational fluid calculations, etc.
- Analysis and ultrahigh-pressure synthesis of samples on request



FIGURE 2 Nanopolycrystalline diamond (NPD, HIME diamond) synthesized at GRC

#### 3. Meetings

A research meeting is to be organized and held, in principle, at Ehime University. If necessary, it may also be held at another domestic institution or university, but a statement of this necessity in the application form is required in this case. It is also acceptable to organize a training (internship) program combining lectures and practical training for the purpose of improving the research techniques of researchers and students.

Once the application is approved, we may cover some travel expenses (*domestic* travel costs and accommodation) of successful applicants, depending on the financial situation at PRIUS. For further details, please see the following website: [www.ehime-u.ac.jp/~grc/prius/index\\_eng.html](http://www.ehime-u.ac.jp/~grc/prius/index_eng.html).

If you are interested in collaborative research at PRIUS, please send an e-mail to [prius@stu.ehime-u.ac.jp](mailto:prius@stu.ehime-u.ac.jp) or directly contact corresponding researchers at GRC.

**Professor Tetsuo Irifune**

Director of PRIUS and GRC, Ehime University, Japan

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