


**From high-pressure mineral physics to
novel nano-ceramics science;
my research history over the Heisei period**

**Tetsuo Irifune
(Professor GRC)**

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Since I took up a position at Ehime University in 1989, I have been working on applications of multi-anvil high-pressure technology to both deep Earth and materials sciences. Phase relations and density changes in materials relevant to the mantle and subducting slabs were first studied by quench method under pressure and temperature conditions of the mantle transition region and the upper to middle regions of the lower mantle. From middle 1990s, I shifted my studies to those using synchrotron facilities at KEK. I particularly focused high-pressure experimental studies on phase transitions, equations of states, and sound velocities of minerals and rocks based on *in situ* X-ray observations after the brighter light source became available at SPring-8 in 1998. On the other hand, efforts have been made in syntheses and applications of novel nano-ceramics using multi-anvil technology since our first report of ultra-hard nano-polycrystalline diamond (Hime-diamond) in 2003. Extensive collaborative studies have been pursued with both domestic and overseas groups using NPD after the PRIUS program was approved by the MEXT in 2015. In this talk, I review aspects of backgrounds, secrets, and influences of some of these studies, which were parts of the driving forces of foundation of GRC in 2001 and its subsequent development over the last two decades.

Contact : Masayuki Nishi, Ph.D. (e-mail: nishi@sci.ehime-u.ac.jp)