

## Development of NPD anvil cell for neutron scattering experiments

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Neutron is a complementary probe to x-ray to investigate microscopic structures and dynamics of the materials located inside the Earth and planets, especially for hydrogen-bearing materials such as ices and hydrous silicates. One of the new generation of spallation neutron source has been constructed and now being commissioned in Tokai, Ibaragi Pref. as a part of the J-PARC project. In order to go beyond the pressure limit of neutron scattering, we are developing an original opposed-anvil high pressure cell with large sample volume, using the nano-polycrystalline diamond (NPD; Irifune et al., 2003) as the anvils. Here we report our current achievements of this project.

To directly observe the symmetrization of hydrogen bonding of various kinds of hydrogen-bearing materials by neutron scattering, we intend to generate pressures at least to 60 GPa. In other words, the pressure will be comparable to diamond anvil cells, despite of much larger sample volume of our cell design reaching to the order of one cubic millimeters. The force to generate such pressure is applied through a pair of NPD anvils with 4 to 5 mm in diameter. These anvils are fully supported from their sides. We have so far tested several types of the opposed NPD anvil cell designs having different anvil shapes and supporting geometries. Results and perspectives will be reported in the presentation.