Recently, we have developed small and/or compact high pressure apparatus for transport and magnetic measurements, a clamp type Palm Cubic Anvil Cell (PCAC) [3] (Fig. 1). PCAC can generate superior hydrostatic pressure than other high pressure apparatus at low temperature.

In this work, for neutron scattering experiments, we optimized the anvil material of PCAC from tungsten carbide (WC) to zirconia ($ZrO_2$) which has relatively strong material strength and relatively transparent to neutron beams. Pressurization test was carried out at room temperature. Duralumin (A7075), aluminium-based hard material, was used for a gasket. Deuterated glycerol was chosen as a pressure transmitting medium because of its good hydrostatic property. A single crystal of NaCl, about 1.5 x 1.5 x 1.5 $mm^3$ in size, was set in the gasket and pressurized with a hydraulic press. Generated pressures in the gasket were estimated from a compressibility of NaCl by determining a lattice constant from (200) reflection at each external load. We confirmed that a generating pressure was about 7 GPa when a load of 80 ton is applied. For low temperature measurement, 4 K closed-cycle refrigerator was used together with PCAC. We expect that PCAC will be useful apparatus in the field of high pressure and low temperature neutron experiments.

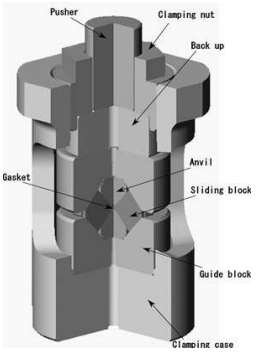

Fig. 1 Schematic cross sectional view of clamp type PCAC.

[1] See, for example, M. Eremets, *High Pressure Experimental Methods, Oxford University Press* **1996**. [2] H. Taniguchi, M. Miyashita, K. Uchiyama, K. Satoh, N. Mori, H. Okamoto, K. Miyagawa, K. Kanoda, M. Hedo and Y. Uwatoko, *J. Phys. Soc. Jpn.* **2003**, 72, 468-471. [3] Y. Uwatoko, K. Matsubayashi, T. Matsumoto, N. Aso, *et al*., *The Review of High Pressure Science and Technology* **2008**, 18, 230-236 (in Japanese).

**Keywords: high pressure, low temperature, neutron scattering**

**L.A.13**

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**Protein Tectonics Platform That Facilitates Synchrotron Radiation Life Science** Hajime Saburi, Hisashi Naitow, Katsuhide Yutani, Michihiro Sugahara, Tomoyuki Tanaka, Yoshinori Matsuura, Tetsuya Ishikawa, Naoki Kunishima, *Protein Crystallography Research Group, RIKEN SPring-8 Center, Harima Institute.* E-mail: hajime_saburi@spring8.or.jp

To understand rationally the function of protein that supports life activities, it is necessary to determine its 3D-structure at atomic level. The X-ray crystallography analysis had previously been the most efficient and popular way to determine protein 3D-structures at atomic level. However, as a result of structural genomics on the hyperthermophile *Thermus thermophilus* HB8, it was revealed that proteins yielding analyzable crystals were only 20% in the genome. To construct a high-throughput framework for the structure determination of challenging targets such as membrane proteins and supramolecular complexes, and to contribute to relevant industrial applications such as structure-based drug design, we launched the Protein Tectonics Platform (PTP) at the SPring-8 campus, Japan, on the basis of synchrotron radiation protein crystallography resources that had been built in the national structural genomics project of Japan's "Protein 3000" initiative (FY 2002-2006).

The PTP at the RIKEN SPring-8 Center enables beamline users to conduct efficient and complete protein science experiments within the SPring-8 campus. The PTP acts as an integrated hub by taking advantage of its location, just 5 minutes from the SPring-8 beamlines. The PTP's technical staff gained experience managing the state-of-the-art platform for the synchrotron radiation protein crystallography with the Protein 3000 project. The combination of the SPring-8 beamlines, the high-performance facility, and the experienced technical staff will promote innovative bio-science in the SPring-8 campus.

In order to disseminate Protein 3000 results for the benefit of society, the PTP is now available to various research groups inside and outside RIKEN. In this poster, detailed contents of the PTP and its availability will be introduced.

**Keywords: PTP, SPring-8, Protein 3000**

**L.A.14**

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**The Influence of Apatite-Plate Orientation on the Behaviour of Living Cells** Marzena Suder,[a] Małgorzata Tyszka-Czochara,[b] Katarzyna Stadnicka,[a] [a]*Department of Crystal Chemistry and Crystal Physics, Faculty of Chemistry, Jagiellonian University, Kraków*. [b]*Faculty of Pharmacy, Jagiellonian University Medical College, Kraków (Poland)*. E-mail: suderm@chemia.uj.edu.pl

The adsorption of acidic non-collagenous proteins like phosphophoryn and osteonectin on faces of synthetic single-crystal hexagonal hydroxyapatite, $Ca_5(PO_4)_3(OH)_2$ was found to be preferential for (10-10) face [1]. It has also been shown *in silico* studies that the adsorption of three amino acids: glycine, proline and hydroxyproline, the major components of the collagen type I, is preferential at monoclinic hydroxyapatite (01-10) face [2]. The adsorption of proteins at (10-10) affects the crystal morphology of bone apatite so the crystals are elongated in c-direction. Since adhesion of living cells to surface of biomaterials is mediated by protein layer, the different faces of apatite may cause different cellular behaviour. The representative minerals of apatite family, with the general chemical formulae $[A(1)_2][A(2)_3](BO_4)_3X$ [3] and $P6_3/m$ space-group symmetry, were investigated in respect of the influence of crystallographic orientation on the fibroblast cells. The number of living cells proliferating on the single-crystal mineral plates with crystallographic orientations (10-10), (10-11) and (0001) was evaluated by direct counting, and by the measurement of formazan absorbance and by the luminescence assay for ATP detection. The cytotoxicity of the mineral samples was excluded in MTT test. Single-crystal X-ray diffraction was used to determine the crystal structure of the mineral apatites confirming their chemical formula: $Ca_5(PO_4)_3F_{0.69}(OH)_{0.31}$, $Ca_5(PO_4)_3F_{0.55}(OH)_{0.43}Cl_{0.02}$ and $Ca_{4.74}(PO_4)_3F_{0.24}(OH)_{0.24}Cl_{0.05}$. Our results clearly indicate the preferential interaction of the fibroblast cells with the (10-10) plates.

[1] R. Fujisawa & Y. Kuboki *Biochimica et Biophysica Acta* **1991**, *1075*, 56-60. [2] N. Almora-Barrios, K. F. Austen & N. H. de Leeuw *Langmuir* **2009,** *25*, 5018-5025. [3] T. J. White & D. ZhiLi *Acta Crystallographica* **2003**, B*59*, 1-16.

**Keywords: mineral apatites, living-cell interactions**