

Poster Presentation

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Radical doping and high-pressure freezing in an advanced neutron crystallography

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The isotope effect in conventional neutron protein crystallography (NPC) can be eliminated by the proton polarization technique (ppt) as an advanced NPC. Furthermore, the ppt can improve detection sensitivity of hydrogen (relative neutron scattering length of polarized proton) by approximately eight times in comparison with conventional NPC. Several technical difficulties, however, should be overcome in order to perform the ppt. In this poster, two developing fundamental studies to realize ppt will be presented; 1) radical doping into protein crystals that facilitates sample electron polarization, which was analyzed by X-ray crystallography, liquid-chromatography/mass-spectrometry (LC/MS) and electron spin resonance (ESR) measurement, 2) high-pressure flash freezing performed especially using a new machine of HPC-201 (ADC Inc.), which has the advantage of making bulk water amorphous without destroying the single large crystal, may easily realize the low temperature environment of crystal at around 1K. The former results were that radical molecules distributed non-specifically around proteins, and that they were included in protein crystal to some extent [1]. These are a favorable tendency for better proton polarization.

[1] I. Tanaka, K. Kusaka, T. Chatake, N. Niimura, *J. Synchr. Rad.*, 2013, 20, 958-961

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