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Radiation Damage of Protein Crystal in Various X-ray Energies. N. Shimizu^a, K. Hasegawa^a, G. Ueno^b, M. Yamamoto^{a,b}, ^aStructural Biology Group, JASRI/SPring-8, ^bDiv. of Synchrotron Radiation Instrumentation, RIKEN SPring-8 Center, 1-1-1 Kouto, Sayo, Sayo, Hyogo 679-5198 Japan.

The radiation damage of biological crystal sample always becomes a serious problem for the structural analysis. Most protein crystallographers expect that the use of high energy X-ray is one of the methods to overcome it. However, no one might systematically verify the effect. In order to examine the effect of X-ray energy on radiation damage, we collected 12 ~ 15 data sets from one crystal at 9 different X-ray energies (6.5, 7.1, 8.3, 9.9, 12.4, 16.5, 20.0, 24.8 and 33.0 keV).

Lysozyme crystals with tetragonal form ($P4_32_12$) were used as a sample for this comparison. The diffraction experiments were performed at BL41XU of SPring-8. One data set includes 180 images recorded with an oscillation step of 1.0°. The exposure time was set to 0.3 ~ 5 seconds according to the energy. Our data indicated that the increase of mosaicity started by the irradiation of photons larger than 10^{13} for all X-ray energies. On the other hand, the amount of the change of mosaicity in high energy was shown smaller than that in low energy. In the presentation, we want to discuss the radiation damage of protein crystals by using all other data.