# Development of Polarized XAFS Measurements for Small Single Crystals

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To develope XAFS equipment using fluorescence for small single crystals in BL10XU, we tested the performance of beam line by measuring EXAFS in a transmission mode for the first step. We measured powder sample of $PRu_4P_{12}$ below T = 301K which was interested in the origin of metal-insurator transition at $T_{MI}$ = 60K. We chose Ru K-edge (22.12keV) to evaluate the performance of the spectrometer in high energy region where SPring-8 undulator had an advantage of high flux. Si(111) was used as monochromator and ion chambers filled with Ar gas were used as incident beam and transmitted beam monitors.

Since the bandwidth of undulator radiation is narrower than the energy range of a typical EXAFS scan, adjustment of undulator gap during EXAFS measurements are required. We studied the relation between the gap value of undulator and the energy value where beam intensity is maximum. Using the results, undulator gap was changed for 9 times during Ru K-edge EXAFS measurements.

Fig. 1 shows the EXAFS with $I_0$ at T = 301K. As is shown, S/N ratio of the spectrum

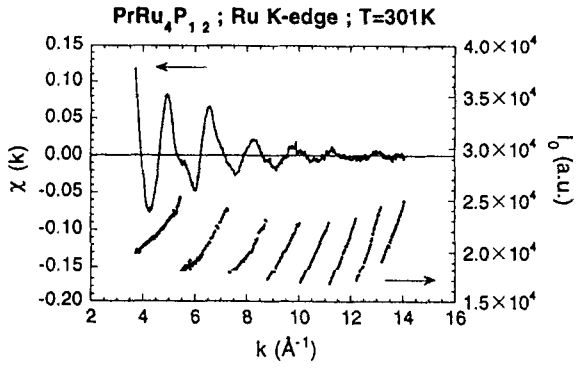


Fig. 1 Ru K-edge EXAFS of $PrRu_4P_{12}$ (line) and $I_0$ (doted) at T=301K.

is high and there is no noise due to changing of the undulator gap. We isolated the Ru-P shell EXAFS contribution and performed least-squares curve fitting based on the phase shift and amplitude functions calculated by FEFF6. As a result, the fitting line reproduced the data quite well. The obtained Ru-P distance was almost constant over a wide temperature range below T = 301K, indicating that the coordination of Ru is almost T-independent. The fact that all of the observed Ru-P distances fall within an experimental error indicates that the reproducibility of the measurements are quite well.