Preliminary results of fluorescence Cu K-edge XAFS spectra and high energy K-edge XAFS spectra of AgI-related samples

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In ion-implantation technique it is achieved by controlling ion dose accurately that 'isolated Cu species' of desired dilute concentration are dispersed within a thin layer in a silica glass plate. The aim of this study is to elucidate relationship between the local structure and the luminescence property of the Cu species. In this beam time we measured preliminary fluorescence Cu K-edge XAFS to ascertain that performance of the beam line and the equipment are enough for our experiments because of no fluorescence mode measurement before our trial. The silica glass plate sample with the Cu species of $1 \times 10^{+17}$ ion/cm^2 dose was used.

Also we carried out preliminary XAFS measurements at relatively high energy K-edge and in a cryostat system. For example, the Ag K-edge XAFS were measured for crystal (*c*-) and glassy (*g*-) AgI at room temperature and 8K to study the temperature dependence of the EXAFS Debye-Waller factor. The *g*-AgI with composition of 55AgI · 45CsI in mol% was prepared by a conventional melt-cooling method where CsI is vitrifying additive. The glass sample, which was ground and sealed with a polyethylene film, was used.

During both measurements the storage ring was operated with the electron energy of 8 GeV and the current of about 12-15mA, respectively. The intensity of incident beam of X-ray, I_0, which was monochromatized with two flats Si(311)crystals, was monitored by an ionization chamber, and those of the fluorescence X-ray from the samples, I_f and the transmitted beam through the samples, I were measured by a 'Lytle type' detector and by an ionization chamber, respectively. We have examined and tuned the detecting system to reduce noise and set up the cryostat system before the measurements.

Fairly good XANES features were obtained in the Cu K-edge measurement by accumulating scans for several hours. However, the quality of the EXAFS region was not so satisfactory for analysis of the local structure unfortunately.

The Ag K-XAFS were obtained in the photon energy range from 25.0 to 26.6 KeV(Fig. 1). The spectra of the glass at room temperatures and that of the crystal at 8 K were well in quality while the spectrum of the crystal at 8 K has distortion at pre-edge and high energy region. This may be due to the inhomogeneity in the samples.

Now the data analysis is in progress.

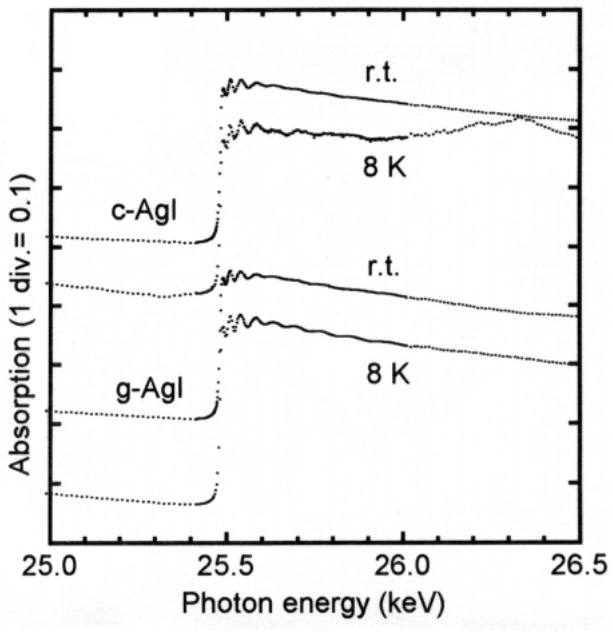

Fig. 1 . Ag K-XAFS of crystalline and glassy AgI.