

Crystal structure analysis of zeolite using high resolution powder diffraction and anomalous dispersion effect

Yoshiharu Toriumi* (0003681), Kazuyuki Okada (0003679), Hikaru Iwanaga (00003680), Yuuji Mori (0003682), Hideki Hashimoto (0001403)

Material Science Laboratory, Toray Research Center, Inc.

Faujasite type zeolites (X or Y) are extensively used as adsorbents, and its adsorptive capacity is strongly effected by sites and occupancies of cations. Synchrotron radiation is expected to effectively determine those cation sites and occupancies, because parallel beam optics allow high resolution powder diffraction and wavelength tuneability is make it possible to use the anomalous dispersion effect, which is considered to effectively determine cation positions. We have investigated AgY zeolite in this time.

Powder diffraction data were measured using the seven-axes diffractometer in BL02B1. The combination of analyzer crystal (Si(220)) and scintillation counter was used for high resolution data collection. Since K-edge of Ag is 0.4859\AA , wavelengths of 0.4866\AA and 0.4851\AA were selected. The Si (111) double-crystal monochromator and no focusing mirrors were used. Powder patterns of two data sets are shown in Figure 1 and 2.

These high resolution data meet our expectations. But diffraction intensity was very weak and peak-to-background ratio is too bad to analyze the crystal structure.

Figure 3 shows a data measured for $\lambda=1.0\text{\AA}$. The resolution of this powder diffraction pattern is also high, on the other hand peak-

to-background ratio is low. The evaluation of obtained data and the examination of strategy for structure analysis are in progress.

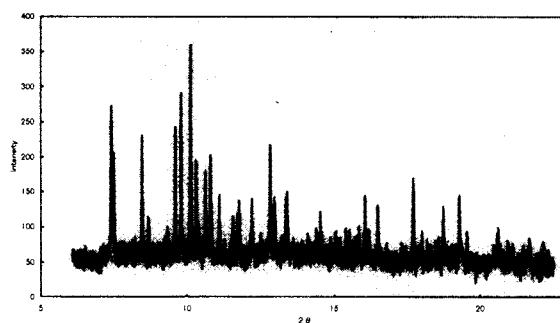


Figure 1 $\lambda=0.4866\text{\AA}$

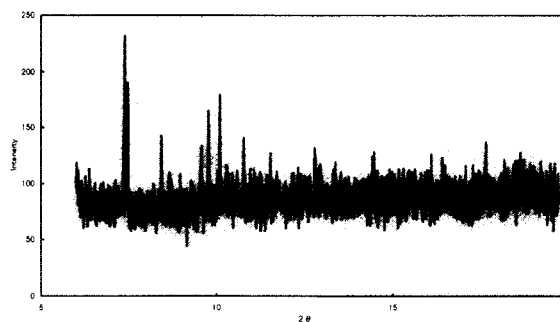


Figure 2 $\lambda=0.4851\text{\AA}$

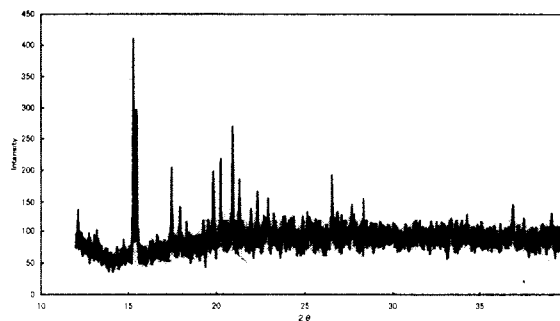


Figure 3 $\lambda=1.0\text{\AA}$