Subject Title X-ray fluorescence analysis of bronze mirror from China and Japan

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An analysis of ancient mirrors became the fifth this time too.The previous experiments we verified of Chinese mirror were produced the Three Kingdoms period and Japanese mirror were produced the Tumulus period have determend that they can be divided into some groups according to the distribution of Sb/Sn and Ag/Sn. But the Japanese mirrors showed unevenness in distribution area of Sb/Sn and Ag/Sn and it was had how interpreted this left as a proble. Therefore we analyzed the mirrors excaveted from Japanese tumulus chiefly this time.

To the mirrors excavated from Japanese tumulus, there are two kinds that were produced in Japan when imported by Japan from Chinese Three kingdoms and Western Jin period. As a result of having analyzed these, a tendency of a Japanese mirrors became clear as follows.

1. Many of the mirrors which was brought by China had a Sb/Sn ratios 0.006 to 0.013, and Ag/Sn ratios. 0.002 to 0.005. Judging from a conventional experiment result, this ratios is in a group of the Chinese Three Kingdoms and Western Jin mirrors. However, four mirrors showed a Sb/Sn, Ag/Sn ratios to be almost 0, this ratio is an unprecedented result.

2. The mirrors which was produced in Japan, Yayoi period through early Tumulus period, had a Sb/Sn ratios about 0.01, and Ag/Sn ratios about 0.003. This ratios is approximately the same as 1. But however there is a still little number of the samples.

3.While mirrors produced in the early Tumulus period and later had relatively high ratios of Sb/Sn more than 0.01, and Ag/Sn 0.003 to 0.007, and the distribution range spreads, too. Sb/Sn in particular goes roughly and can divide it into two domains of 0.01 to 0.019 and 0.02 to 0.005.

Thus the Japanese Tumulus period mirrors understood that a ratios was distributed over a considerably wide range from this result.

Structural studies on iodine-doped poly(vinyl alcohol) films by extended X-ray adsorption fine structure techniques for the preparation of a high quality polarizer

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Iodine-doped poly (vinyl alcohol) (I-PVA) film has attracted a great deal of attention because of its use of high quality polarizer. The polarized nature is due to a high ability of a polyiodine-PVA complex formation in the film. We have studied on the orientation and local structure of polyiodine for the development of high quality polarizers.

Drawn I-PVA films were prepared by uniaxial drawing of the I-PVA films and employed in the EXAFS experiments. The EXAFS spectra of K-edge of iodine were collected in transmission at room temperature at the Spring-8 beamline BL19B2. Typical examples of the Fourier transform spectra of EXAFS data [$k^3\chi(k)$] are shown in Figure 1 where the electric field vector is parallel(//) and perpendicular($\perp$) to the drawn direction. The first nearest neighbor (n.n) shell at around 2-3 Å can be assigned to the 1st n.n I-I coordination of mainly I_3^- anion since the peak position is consistent with that of I_3^- solution. It is noted that the intensity of the // spectrum corresponding 1st I-I coordination increased compared to that of the $\perp$ spectrum for the highly drawn I-PVA film (DR=5.5). This indicates that I_3^- anion is highly oriented along the drawn direction of the highly drawn I-PVA film. It is well known that the polarized nature of the I-PVA film is improved with increasing the draw ratio. The EXAFS data was found to be quite useful for evaluation of the orientation property of a polyiodine anion that is related to the polarized nature in high quality polarizer for practical use.

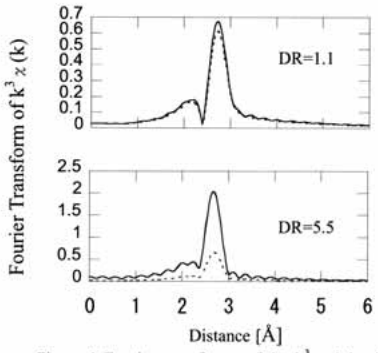

Figure 1 Fourier transforms of the k^3 weighted EXAFS oscillation functions $k^3\chi(k)$ of the I-PVA film. solid line: the // spectrum, dashed line: the $\perp$ spectrum. DR: draw ratio.