

Semiconductor to Metal Transition and Local Structure in Arsenic Tellurides

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1. Introduction

It is important to study the local structures of liquid (l-) As-Te mixtures, because they undergo the semiconductor to metal (S-M) transition at high temperature.¹⁾ SPring-8 has an advantage to measure the X-ray absorption spectra for high energy region including the Te *K*-edge (31 keV). In the present paper we report the result of Te-*K*-edge EXAFS for liquid Te and As₂₀Te₈₀ measured at BL01B1 at SPring-8 and the comparison with the data measured at Photon Factory.

2. Experimental and Data analysis

The mixtures were prepared by weighing 99.999% pure As and Te and by vacuum sealing them in silica glass ampoules. More detailed procedure of sample preparation is described elsewhere.¹⁾

K-edge X-ray absorption spectra were obtained at BL 01B1. A Si(311) double crystal monochromator was used. X-ray absorption spectra were recorded in transmission mode using the ionization chamber detector. The sample was located in a quartz cell with a suitable sample thickness. The EXAFS interference function, $\chi(k)$, was extracted from the absorption spectra by the program of XANADU code described elsewhere.²⁾

3. Result and Discussion

Figure 1 shows the comparison between EXAFS $\chi(k)$ of Te *K*-edge for l-As₂₀Te₈₀

(500°C) measured at BL01B1 in SPring-8 and that at BL10B in Photon Factory. The quality of the spectrum measured at SPring-8 is well improved, especially at high *k* region. We have good hopes that SPring-8 provides high quality data of EXAFS for high energy region such as Te *K*-edge.

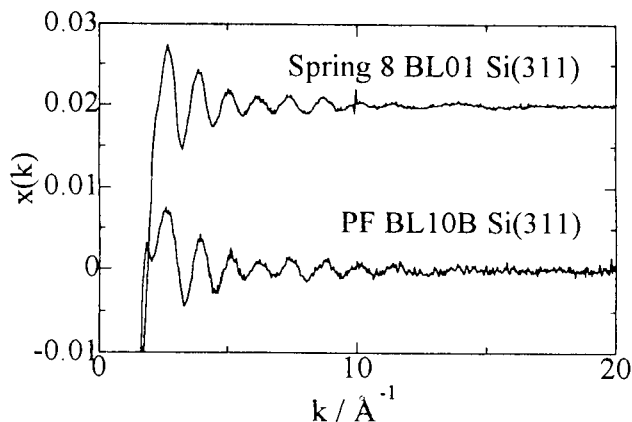


Fig.1 The comparison between EXAFS $\chi(k)$ spectra of Te *K*-edge for l-As₂₀Te₈₀ (500°C) measured at BL01B1 in SPring-8 and that at BL10B in Photon Factory.

4. Acknowledgements

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References

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