

## **Broad-band polarizance of a synthetic muscovite crystal in soft x-ray region**

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To develop the polarizer functioning in the soft x-ray region from 12-25 nm, the polarization performance of a synthetic muscovite has been investigated theoretically with a simulation code using Fresnel equations and optical constants from CXRO database. As the result of calculation, The muscovite crystal is very proper as a reflection-type polarizer with the reflectivity  $1.4 \cdot 10^{-2}$  at 25 nm and  $6.4 \cdot 10^{-4}$  at 12 nm for s polarization,  $9.0 \cdot 10^{-5}$  at 25 nm and  $4.9 \cdot 10^{-6}$  at 12 nm for p polarization at the angle of grazing incidence of  $48^\circ$ , and the polarizance varies from 98.5% to 99.2%. To verify the polarization performance of the muscovite crystal experimentally, the reflectance of muscovite crystal for s and p polarization was measured in a home-made synchrotron radiation soft x-ray polarimeter at beamline 3W1B of Beijing Synchrotron Radiation Facility (BSRF). The reflectivity of the muscovite crystal at the angle of grazing incidence of  $48^\circ$  were obtained from the experimental data, which are about  $4.8 \cdot 10^{-3}$  at 25 nm and  $6.0 \cdot 10^{-4}$  at 12 nm, and the linear polarizance of the x-ray reflected by the muscovite crystal we measured reaches 96.6% in this soft x-ray region, while higher than 98.2% in the simulation, respectively. The result indicates that this muscovite crystal works as a practical polarizer in this soft x-ray region of 12-25 nm, and also extensive wavelength region high than 25 nm.

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