

Diffraction efficiency of multi-level zone plate fabricated by sputtered-sliced method for hard X-ray focusing

Masato Yasumoto¹, Shigeharu Tamura², Nagao Kamijo³, Yoshio Suzuki⁴,
Akihisa Takeuchi⁴

¹*RIIF, AIST Tsukuba, Tsukuba Ibaraki, 305-8568, Japan*

²*PRI, AIST Kansai, Ikeda Osaka, 563-8577, Japan*

³*Kansai Medical University, Hirakata Osaka, 573-1136, Japan*

⁴*JASRI/SPring-8, Sayou-gun, Hyogo 679-5198, Japan*

We have been developed a kinoform type zone plate (KZP) fabricated by sputtered sliced (SS) method for hard X-ray microspectroscopy. The KZP has much higher diffraction efficiency than conventional zone plates [1]. The ideal diffraction efficiency of the KZP is 100% without considering the X-ray absorption. Especially, the SS-KZP can be applied for the higher energy X-ray focusing due to the high aspect ratio.

As a first step of the KZP development, we fabricated a multi-level-type (Cu/Al, 4-level) zone plates at AIST and tested at BL-20XU of SPring-8 [2, 3]. The Cu/Al 4-level zone plate has two half layers between a transparent layer and an opaque layer. In this study we discuss the calculated focusing efficiency of the multilevel type zone plate fabricated by the SS method. Moreover, the multi-level zone plates composed of other material combinations such as W/C, Cr/C, Ag/C, Cu/C are also discussed.

[1] M. Yasumoto et al., Proc. of XRM2002, pp189-192

[2] N. Kamijo et al., in this conference

[3] S. Tamura et al. in this conference