Phase Contrast Hard X- ray Microscopy with the Spatial Resolution better than 100 nm

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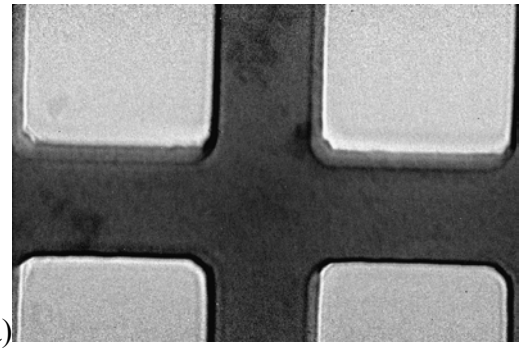
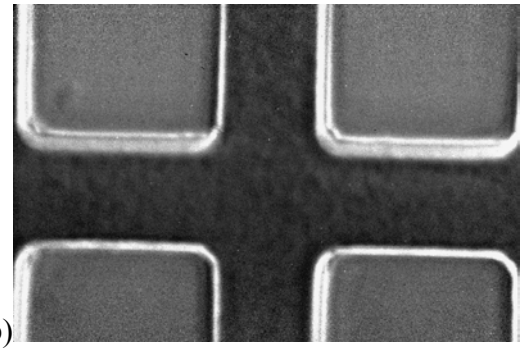
The present status of the hard x-ray full field microscopy[1] at 1B2 beam line at PLS (Pohang Light Source) will be presented.

This is an analog of an optical microscope, consisting of a condenser and an objective zone plates. We further magnify the visual image on the scintillation crystal with a microscope objective. Zernike phase contrast was lately implemented by adding an annular aperture on the condenser zone plate and phase plates at the back focal point of the objective zone plate.

Below are images of a Cu #2000 mesh taken a) in amplitude and b) in Zernike phase contrast at 6.95 keV. In figure b) the edges of the square holes look brighter than the background because it was shot in negative phase contrast.

fig. a)  fig. b) 

Figures a) and b). Cu #2000 mesh imaged with 1B2 transmission x-ray microscope in bright field and in negative phase contrast, respectively. The width of a bar and a square in the Cu # 2000 is 5 and 7.5 microns, respectively. The field of view is about 20 × 13 micron^2.

[1]. Hwa Shik Youn, Soo Yeun Baik, and Chang-Hwan Chang, Rev. Sci. Instrum. **76**, 023702 (2005).