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Fabrication of Profile-Coated Rhodium X-Ray Focusing Mirror

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Abstract : A pair of Kirkpatrick-Baez (KB) mirrors were designed and fabricated for experiments within a hard x-ray energy range lower than 20 kev at beamline 20-ID in a synchrotron radiation facility, Advanced Photon Source (APS). The KB mirrors were deposited with Rhodium thin films using a customized designed and self-built magnetron sputtering system. The purpose of these mirrors is to focus the x-ray beam down to 1 micron. This is the first pair of Rhodium-coated KB mirrors with elliptical shape that was fabricated using the profile coating technique. The profile coating technique is to coat the substrate with designed shape using masks during the deposition. The mirrors were equipped at the beamline and achieved the designed focusing requirement. The details of the mirror design, the fabrication process, and the customized magnetron sputtering deposition system will be discussed.

Keywords : magnetron-sputtering deposition, focusing optics, x-ray, rhodium thin film
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