Differential deposition to correct surface figure deviations in astronomical grazing-incidence X-ray optics

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ABSTRACT

A coating technique is being developed to correct the surface figure deviations in reflective-grazing-incidence X-ray optics. These optics are typically designed to have precise conic profiles, and any deviation in this profile, as a result of fabrication, results in a degradation of the imaging performance. To correct the mirror profiles, physical vapor deposition has been utilized to selectively deposit a filler material inside the mirror shell. The technique, termed differential deposition, has been implemented as a proof of concept on miniature X-ray optics developed at MSFC for medical-imaging applications. The technique is now being transferred to larger grazing-incidence optics suitable for astronomy and progress to date is reported.

Keywords: Grazing incidence X-ray optics, Differential deposition, Surface figure deviations in X-ray optics