Abstract

We report on the continuing development of adjustable, grazing incidence X-ray optics for 0.5 arcsec telescopes. Adjustable X-ray optics offer the potential for achieving sub-arcsecond imaging resolution while sufficiently thin and light-weight to constitute a mirror assembly with several square meters collecting area. The adjustable mirror concept employs a continuous thin film of piezoelectric material deposited on the back of the paraboloid and hyperboloid mirror segments. Individually addressable electrodes on the piezoelectric layer allow the introduction of deformations in localized "cells" which are used to correct mirror figure errors resulting from fabrication, mounting and aligning the thin mirrors, residual gravity release and temperature changes. We describe recent results of this development. These include improving cell yield to ~ 100 per cent, measurements of hysteresis and stability, comparisons of modeled and measured behavior, simulations of mirror performance, and the development and testing of conical Wolter-I mirror segments. We also present our plans going forward toward the eventual goal of achieving TRL 6 prior to the 2020 Decadal Review.