

## V205a TMT Mirror Coating Exposure Test - 1 year After

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In this report, we describe the characteristics of optical coating coupons after one year exposure at a telescope environment and discuss likely implication on the coating cycle of optics.

The primary, secondary, and tertiary mirrors of the Thirty Meter Telescope (TMT) need to allow observations in the wide wavelength range from 0.3 to 30  $\mu\text{m}$ , thus their optical coating should give as much reflection as possible. The first-light coating uses the well-established recipe from Gemini telescopes' experiences covering visible to IR wavelengths. However, this silver based and protected coating does not give much reflection in shorter wavelengths.

TMT obtained experimental coating coupons with UV-enhancement. In order to check the durability at the real condition of a telescope, we started to expose coupons at Keck I telescope in August 2022. A set of coupons are retrieved in October 2023. The UV-vis reflectivity (evaluation by Cary5000) show slight degradation. However, there is no distinct feature or dip in narrow range nor faster deterioration in shorter wavelengths. In addition to the UV-vis data, we are getting measurement in 3-30  $\mu\text{m}$  range. While there are two broad-band features likely from the overcoats, there are no narrow or spiky features.

By comparing with the T=0 data, these T=1 (year) data give first glimpse of the rate of the coating degradation at the working telescope's environment.