

# **Performance of rare earth based multilayers for the 63 nm solar O V imaging applications**

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## **Abstract**

Rare earth elements are known for their low absorption owing to unfilled  $4f$  and  $5d$  electronic shells, therefore make them ideal as spacer materials for multilayers operating in the vicinity of O V line at 63 nm. Solar imaging of the O V emission would provide unprecedented observation of solar atmosphere at an intermediate temperature, filling the gap of what already been observed between the low temperature He II line and high temperature Fe lines. With the most recent measured optical constants of several rare earth elements, the theoretical performance of normal-incidence reflectance of multilayers pairing between these elements such as La, Nd, Gd, Tb, Dy, and Ho and candidate absorbers such as Si,  $B_4C$ , and etc. will be presented. Comparison between calculated and available measured reflectance as well as parameters limiting the peak performance of these different multilayer mirrors will be discussed.