



1. Title:	Study of contamination of Mo/Si multilayer mirrors in water and hydrocarbon environment under controlled vacuum conditions
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3. Abstract body:

In the presence of EUV radiation and residual species in the vacuum chamber, Mo/Si multilayer optics gets contaminated. Past research has shown two competing processes, oxidation of the capping layer and Mo/Si multilayer or carbon contamination on the surface of the capping layer. Either effect causes degradation in the reflectivity of the multilayer optics. Past research has shown contradictory results based on subtle experimental variations including either the pulse structure of the EUV radiation or different vacuum conditions. The current research presented here is with a 10W pulsed EUV source from Energetiq, the EQ-10M, and a carefully controlled vacuum environment measured with an Extrel quadrupole mass spectrometer. Sample Mo/Si multilayer "optics" have been irradiated for long durations (millions of pulses and Joules of accumulated EUV radiation dose) in the presence of water and/or selected hydrocarbons. The vacuum environment has been varied with precision leak valves and measured with the quadrupole mass spectrometer while the Mo/Si surface is exposed to EUV radiation. The Mo/Si multilayers were then analyzed with x-ray photoelectron spectroscopy to determine the surface contamination. The results of these tests will be shown.