1. Title:	Interface engineering of Mo/Si multilayers for enhanced reflectance in EUVL applications
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3. Abstract body:
For commercial application in EUV lithography tools, strict requirements are posed for the lifetime and throughput of illuminator and projection optics. It is generally accepted that such requirements can be met by modifying the “traditional” Mo/Si multilayer stack by means of ultra-thin layers, to act as diffusion barriers. The resulting reduced interdiffusion at the Mo/Si interfaces creates a sharper optical contrast, thereby enhancing reflectance. Due to the inverse relation between diffusion barrier thickness and peak reflectance at EUV wavelength, the current challenge lies in understanding layer growth mechanisms in order to create ultra-thin physical and/or chemical barriers.

In this work, we present recent results on Mo/Barrier/Si/Barrier multilayers, deposited by e-beam and magnetron sputtering, with the emphasis on reflection enhancement. We study composition of the formed interlayers with XPS. We show that ultra-thin reflectance enhancement interfaces can be deposited with low added multilayer stresses. A near-normal incidence reflectivity of 70.3% at 13.5 nm was obtained in these systems. Ultra-thin barrier layers can also be applied in capped multilayers to counterbalance the inherent loss of reflectance that is often present when using thick diffusion barriers and or protective layers in the capping system. We present new data on capped multilayers that show improved reflectivities, without sacrificing the protective nature of the capping layer.