Surface Roughness Improvement in EUV Mask Materials

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High quality EUV mask materials are needed for next generation EUV lithography at the 7 nm node and beyond. Current State-of-the-Art materials include Mo-Si multilayers, Ruthenium capping layers. EUV Reflectivity at the mask is strongly impacted by the presence of defects that arise during fabrication of the multilayer fabrication. These impart phase changes, amplitude changes and ultimately print on the wafer. Mask defectivity is currently the number 3 issue in EUV readiness. We consider new materials for EUV Mask and evaluate improvements in RMS surface roughness compared to the state of the art. These improvements are evaluated by AFM and correlated to EUV measurements. We explore the impact of a defects and their impact on EUV reflectivity measurements made by alternative materials, and whether this can ultimately reduce the importance of defectivity in wafers. Astrileux is a next generation semiconductor start-up company and is supported by National Science Foundation, CASIS, the Center of Advancement of Science in Space, DOE, Cyclotron Rd at LBNL, and LBNL Molecular Foundry. In 2016 Astrileux the first place winner of the Materials Research Society iMatSci competition.