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Extendibility of EUV Lithography Technology for Semiconductor Devices

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Abstract

Extreme ultraviolet lithography (EUVL) using 13.5nm wavelength has been expected to be the mainstream of semiconductor device production process for 22nm half pitch and below. Even though many potential problem has been solved recently, there are several issue to be overcome to meet the mass-production requirements. Source power, mask infrastructure and resist performance are in the top list of critical issues. Due to the delay of EUVL insertion into mass production, all the critical components should be prepared for the finer pitch printing. Mask will be one of the biggest hurdle for this extendibility. During the last 15 years, we have focused on the development of EUV mask related technologies including mask materials, mask designs, fabrication processes and metrology. Our own original metrology tool, Coherent Scattering Microscope (CSM), based on computation of diffraction patterns has its unique potential to confirm the mask performance under the various real exposure conditions. Material design based on optical simulation and empirical results by CSM can provide extendibility solution. Our research activities related to the extendibility of EUV lithography will be introduced in the presentation.