Ecosystem Readiness Towards High NA in IMEC (Keynote)

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EUV Lithography using 0.33NA full field scanners, has entered production in 2019 in the biggest foundries, driven by the 7nm logic technology nodes on a limited number of layers. In the meantime, 5nm and 3nm technology have entered production, with more and more EUV layers and also EUV based double patterning. Like for 193nm immersion lithography, EUV multiple patterning becomes increasingly complex and costly, and the cycle time increases. Besides the logic foundries, also the DRAM memory manufacturers announced to start inserting EUV lithography for the same reasons.

In order to reduce cost, complexity and cycle time, High NA EUV lithography is under development. Besides the development of the optics and the scanner, also the complete EUV Eco-system consisting of EUV materials, metrology and EUV masks need to be updated to enable a smooth insertion in High Volume Manufacturing.

As of 2023, imec and ASML will open a high NA EUV Lab, where the first high NA scanner will be installed, together with a track and some metrology systems. In this lab, the ECO-system readiness for high NA EUV will be developed and ultimately demonstrated. In this presentation we will demonstrate the challenges for the high NA ECO-system and give an update of the status of the developments.

Presenting Author

Kurt Ronse, Ph.D. has been working in the field of lithography at imec for over 30 years with responsibilities ranging from lithography researcher, lithography group manager, advanced patterning department director and advanced lithography program director. Currently is leading the Advanced Patterning Program that is focusing primarily on the enablement of High NA EUV lithography ECO system and on the extendibility of EUVL to the next technology nodes for logic and DRAM. Also the feasibility of exploratory patterning techniques like DSA and ASD are being assessed.

Prior to joining imec, Ronse received a Ms. and Ph.D. degree in Electrical Engineering from the University of Leuven (Belgium).

In 2016, he has been elected Fellow of SPIE for achievements in microlithography and advanced patterning.