New Advances in EUV Mask Blank Cleaning

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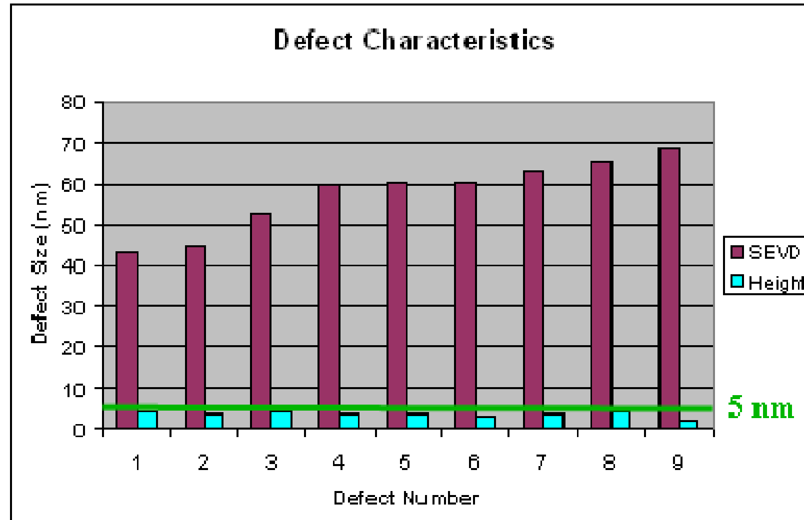
For the successful implementation of extreme ultra violet (EUV) technology in high volume manufacturing, all substrate defects should be removed. The requirement of total defect removal makes EUV substrate cleaning the most challenging subject in the field of particle removal in the world today.

In this paper, we present the latest results of EUV mask cleaning activities at International SEMATECH in Albany, New York. The topography and composition of existing defects on mask substrates and their removal by wet cleaning will be discussed. In particular, we will show the recent results of removing particles ≥ 4 nm high (see figure below).



Defect distribution on current low thermal expansion materials (LTEMs) and fused silica glasses will be represented. Cleaning properties of Ru- and Si-capped multilayers will be discussed.