Semiconductor
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SEVENTH FRAMEWORK PROGRAMME

SEAL PROJECT – BULLETIN

SEAL SP2 - EUVMTP HamaTech EUV MaskTrack*Pro*

AT A GLANCE

Optimization of the SÜSS MaskTrack*Pro* mask cleaning tool platform from process and hardware perspective. Implementation of a cleaning process addressing the specific contaminations on EUV mask backsides as well as an assessment of software and hardware reliability for high volume mask manufacturing.

SEAL SP2 – PARTNERS

SÜSS MicroTec PE*, Germany
imec, Belgium
Intel, Ireland

- Intrinsic cleanliness of the MaskTrack*Pro* mask cleaning equipment and Automation module (MT*Pro* InSync) proven
- Cleaning process for the EUV mask backside qualified
- Tool reliability (hardware & software) quantified and confirmed
- Integration of EUV reticle backside inspection into the automation module (SPARK system by Nanometrics (= synergy result from activity with another subproject SP10 of SEAL))
- Realized a unique mask infrastructure for integrated cleaning, automated handling and backside inspection of EUV reticles in direct support of Europe's unique field-installed EUV litho cell: i.e. the ASML NXE3100 at imec

FIGURE 1: Cluster of the MaskTrack*Pro* (MT*Pro*) mask cleaning tool and InSync automation module at imec

*) was HamaTech APE GmbH&Co.KG

SEAL WEBSITE
www.seal-project.eu

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HamaTech EUV
MaskTrack*Pro*

Project Results

The qualification of the intrinsic cleanliness for the tool cluster, comprising of the MaskTrackPro mask cleaning tool and the InSync automation module, was done successfully. An effective mask cleaning process for EUV mask backside (BS) for scanner clamping related defects have been successfully defined and qualified. This qualification was based on mask inspection and wafer printing tests. A comparison to the current technology requirements and tool capability recommendations from the perspective of a likely end-user of the tool is provided.

- ✓ Intrinsic cleanliness of all modules of the cluster of MT*Pro* & InSync automation module
- ✓ EUV BS cleaning recipe development
- ✓ MT*Pro* & InSync cluster reliability qualification

Defect size bin	PRE (avg)
Total (all)	0.836289
Total (>200nm)	0.903154
85-200nm	0.828076
0.2-1um	0.907574
>1um	0.849495

TABLE 1: Particle Removal Efficiency (PRE) of chuck-induced defects from reticles chucked on NXE3100 after being cleaned on MT*Pro*.

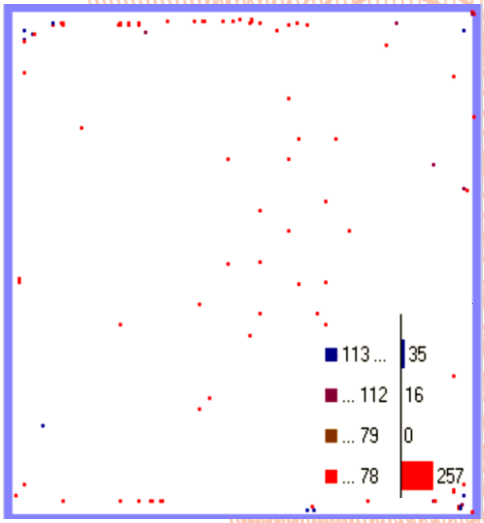

FIGURE 2: Defect adder (larger than 200nm) map of a EUV mask backside after being chucked on a scanner.

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