

Thoughts on defect printability masks...

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Defect printability mask standardization

- [1] Programmed Defect Mask (PDM)
 - Include both phase and pattern defects
 - Arrays in a bright environment for inspection tool calibration
 - Arrays nested in 1D and 2D patterns
 - Phase defects (substrate defects) need to be characterized:
 - With AFM before and after ML coating
 - With blank inspection tool(s) before and after ML coating
 - Include best available fiducial marks on the masks
 - Measure defect locations relative to fiducials using two blank inspection tools (e.g., M7360 & Teron610)
 - Pattern mask with 1D and 2D patterns and alignment marks (e.g., XPA or SEM-based marks) in close proximity of the defects:
 - For the first sub-field, place the alignment marks based on the defect locations from the design layout
 - For a second sub-field, place the alignment marks based on the defect locations obtained from the blank inspection tool results
 - Measure the variation in location of the defects with respect to the alignment marks
 - Inspect with reticle inspection tool(s)
 - Wafer print through process, followed by wafer inspection
 - Review reticle defects with SEM and AIT and AFM
 - Review wafer defects with SEM



Defect printability mask standardization

- [2] Native Defect Mask(s) (NDM)
 - Include best available fiducial marks on the masks
 - Characterize a number of native defects using AFM before ML coating
 - After ML coating, measure defect locations relative to fiducials using two blank inspection tools (e.g., M7360 & Teron610)
 - Characterize selected defects after ML deposition with AFM
 - Pattern mask with 1D and 2D patterns and alignment marks (e.g., XPA or SEM-based marks) in close proximity of the defects:
 - Place the alignment marks based on the defect locations obtained from the blank inspection tool results
 - Measure the variation in location of the defects with respect to the alignment marks
 - Inspect with reticle inspection tool(s)
 - Wafer print through process, followed by wafer inspection
 - Review reticle defects with SEM and AIT and AFM
 - Review wafer defects with SEM