

EUVL Mask Workshop & IEUVI Mask TWG Meetings – Feb. 2004 Review

Critical Issues for EUV Lithography

(October 2003 IEUVI Steering Committee ranking)

1. Source power and lifetime including condenser optics lifetime
2. Availability of defect free masks
- 3. Reticle protection during storage, handling, and use**
4. Projection and illuminator optics lifetime and contamination
5. Resist resolution, sensitivity, and LWR
6. Optics quality for 32nm node

Highlights

- **Intel demonstrated a clean, high contrast, reliable method for introducing fiducial marks after the multilayer film stack, using a laser to convert Mo and Si layers into MoSi. Denser material occupies smaller volume, creates indentation at stack surface.**
- **ISMT demonstrated feasibility of using Data Matrix symbology for automated identification of EUV masks and preliminary proof of using DM for substrate marking.**
- **Mask layout based upon received inputs from interested suppliers was reviewed. Still an early question for many.**
- **Visions and plans from two carrier suppliers reviewed.**

Highlights-2

- **ISMT presented options for low-outgassing, low-particulating materials for carriers.**
- **Progress being made toward meeting P37 surface flatness requirements.**
- **MBDC showed current results on blank development, including scaling laws to evaluate sub-metrology defect densities.**
- **KLA-Tencor presented an e-beam inspection benchtop system with ~25nm resolution.**
- **Different potential cleaning methods were reviewed. Cleaning remains a priority issue for EUV masks.**
- **Thinner, 4.0 mm mask substrate was abandoned.**

EUV Mask Top Technical Issues List

1. **Multilayer defectivity (mask blank).**
2. **Metrology / defect inspection (actinic?).**
3. **Handling & protection.**
4. **Substrate defectivity.**
5. **Mask cleaning.**
6. **Mask repair.**
7. **Tool throughput.**
8. **Mask flatness / thickness variation.**

Status	Comment
	MBDC key issue
	Push existing technology; ebeam option.
	ISMT pursuing carrier; need molecular contamination.
	ISMT investigating several options.

Status colors per ITRS

