

EUV Source Workshop, February 23, 2003

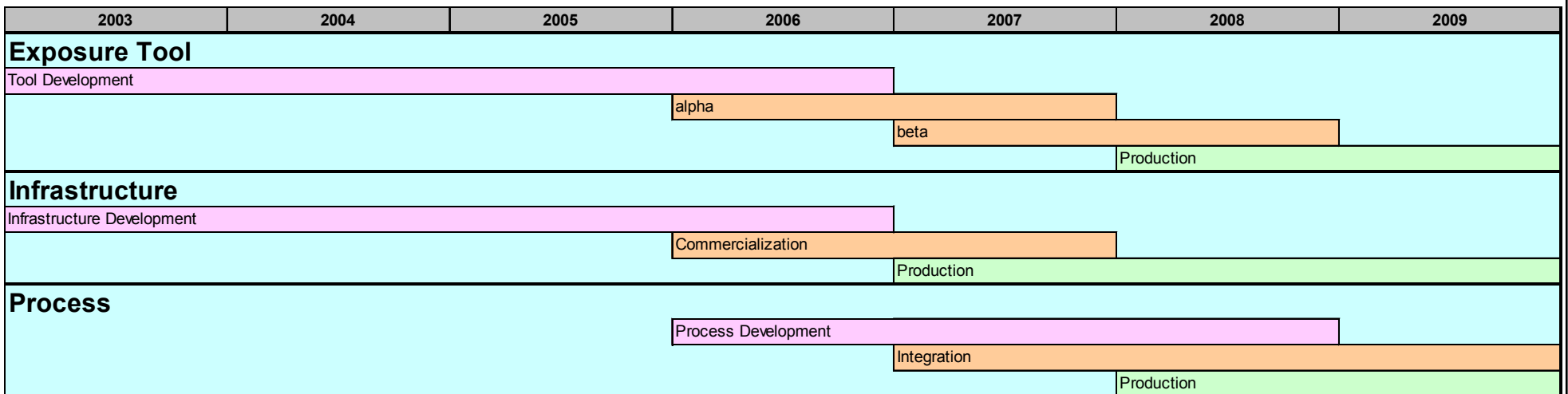
EUV Lithography at International SEMATECH

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EUV Lithography Schedule



- **ISMT roadmap calls for EUV to be introduced in volume production at the 45nm half-pitch node (2007 – 2009 time frame)**
- **Key infrastructure elements must be in place by 2007 to support process development/ integration:**
 - Commercial mask blanks available at “reasonable” yield and cost.
 - Resists available with “reasonable” sensitivity, good resolution and LER.
 - Reticle handling and protection methods and tools in place.
- **Critical issues for exposure technology must be addressed now!**
 - Understanding of source power and lifetime constraints leading to source technology down-select.
 - Optics contamination/lifetime to ensure reasonable uptime and CoO.
 - Mask chuck and substrate flatness requirements, standards and metrology.

EUV Lithography: Critical Issues

1. Source output
2. Defect-free multilayer coated mask blank mfg, including inspection
3. Source & condenser optics reliability
4. CoO of EUV lithography
5. Defect-free patterned mask manufacturing/commercial availability
6. Reticle defect protection (from inspection through exposure)
7. Effective contamination control of optical path (lifetime)
8. High NA optics manufacturing
9. Thermal management of reticle & projection optics at high throughput
10. Resist – high sensitivity at low power with low LER

ISMT Focus: EUVL Infrastructure

- 1) EUV blanks and masks commercially available at production specifications.
 - Substrate flatness < 50nm
 - Defect free multilayer coated blanks
 - Reticle defect protection, handling and standards
- 2) Facilitate development of high power EUV sources
 - >100 wph throughput target
 - Address fundamental limitations, conversion efficiency
- 3) EUV resists meeting resolution, sensitivity, line edge roughness and outgassing requirements.
- 4) Drive a global collaborative effort to validate EUV optics lifetime and contamination protection.

International SEMATECH North:

A partnership between International SEMATECH and Albany Nanotech of the University at Albany-SUNY

- 5-year strategic alliance to develop infrastructure for EUV lithography.
- EUV Mask Blank Development Center will accelerate the development of commercial EUV masks.
- EUV Resist Test Center will support the development of commercial EUV photoresists to meet production requirements.
- State-of-the-art equipment and capability to develop and test tools, materials and processes.



ISMTN Status



- Albany NanoFab 300S Facility
- Clean room, office, classroom space.

- Class 1000 clean room with class 100 process bays.
- EUV mask blank program to occupy 9,720 ft².



- Veeco Nexus multilayer deposition tool delivered February 19, 2003.
- Installation is in progress.



ISM TN Schedule

