

# Top Three Issues for TWG Cooperation

- 1. What is a safe level of resist outgassing?**
  - Work together to determine specifications and procedures, include tool and resist suppliers
- 2. Understanding the resolution limits of chemically amplified resists**
  - Provide enough tool time for cycles of learning
  - Agree on measurement techniques and procedure
- 3. How to optimize photospeed, LWR, shot noise?**
  - Design experiments to investigate these parameters



# Resist outgassing specs?

- ASML Resist outgas specifications/recommendations for Alpha tool:

– H <sub>2</sub> O	4.7E15	(molecules/cm <sup>2</sup> -sec)
– C <sub>x</sub> H <sub>y</sub> (integr. > 44 AMU)	4.7E13	
– F/Cl	4.7E14	
– S/P	4.7E11	
– Si	4.7E9	
- Nikon's requirements 1.10<sup>10</sup> molecules/cm<sup>2</sup>-sec
- ➔ Need to understand the effects and agree with the equipment suppliers what is acceptable contamination level



# Resist outgassing data took from poster session in Miyasaki EUVL symposium

- Re03
    - $1 \cdot 10^{10}$  at  $1 \cdot 10^{11}$  molecules/cm<sup>2</sup>
  - Re05
    - Total outgassing  $\leq 10^{-6}$  Pa
  - Re11
    - Low outgassing resist  $10^{-9}$  mbar sec (mbar l/s)
  - Re12
    - Limit of detection  $10^{11}$  molecules/cm<sup>2</sup>
- We agreed on (molecules/cm<sup>2</sup>-sec) as units
- Status of outgassing methods and tool done

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# Exposure tool availability

- MET at ALS Berkeley : operational scheduled to stop 06-05
- Exitech Intel: operational
- HiNA3 ASET: operational
- PSI Zurich interferometer: operational
- Exitech Albany: scheduled operational 04-05
- ASML alpha tool: scheduled operational 2005/2006



# LER issues

- Standards
- Definition and value of key parameters
- Agree on measurement techniques and procedure
- Round Robin



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