

IEUVI Contamination TWG

Group 2: Key Results

March 2, 2005

NIST

- Water introduced into the chamber led to lower reflectance
 - Likely due to residual hydrocarbons in the chamber
 - Other possible sources of HC include shipping
- Effects of contamination measured
 - HC, S, SO₂, CO₂
- 5 mW/mm², CW, 2e-6 torr H₂O, Base Pressure 1e-12 t, ML1 (some ageing), shipping container not known

NIST, LLNL

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- Benchmarking samples are being used in US and elsewhere for comparison
 - but are nano-structures being considered
- Comparisons for different Ru deposition formulations
- Degradation mechanisms postulated for different classes of capping layers

EUVA, Canon, University

- Atomic H could reverse oxide on surface
- Ru oxidizes under increased H₂O pressure
 - But at 1e-6 Pa, no degradation for 10 hours (NTT SuperALIS)
- Gomei-san model adsorption vs de-sorption
- SEM and Auger shows differences in carbon and oxidation
- Cleaning experiments: 0.03 nm/min 172nm UV + O₂
- Extensive reflectance degradation data versus power and H₂O
- Conditions: Base 6e-9 torr, 120 nW/mm²

European: PTB, TNO, LETI

- Degradation under normal operating conditions was worse under CW
 - pulsed exposure leads to saturation
 - Can be explained by Gomei model
- Need exposure conditions
- PTB can go to $10e-2$ mB total;
Extensive RGA capability
Reflectance resolution: $10\mu\text{m} \times 10 \mu\text{m}$ (microreflectivity)
 73 mW/cm^2 bend magnet; 1000 mW/cm^2 undulator (CW)
- BOC: unsat HC have a greater adsorption rate Pt than saturated (alkenes vs alkanes) more work needed
- TNO: Getting a dedicated DPP source Xe 2nd quarter 05