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: 10um x 10 um (microreflectivity)
  73 mW/cm2 bend magnet; 1000 mW/cm2 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