IIT Bombay Nanofabrication Facility

Tool Name: Raith Long (Raith 150 – Lithography)

Glimpse

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Photograph

RAITH150 is used for ultra-high resolution patterning, pattern inspection and dimensional meteorology. It has the ability to handle wide range of samples including up to 8 inch wafers.

Specifications

1. TFE Filament with Beam size ≤ 2 nm at 20KV
2. Beam current range 5 pA - 20 nA
3. Beam energy 100 eV - 30 keV
4. Stage travel range 150 x 150 x 20 mm
5. Current density ≥ 20,000 A/cm2
6. Current stability ≤ 0.5 % / 8 hours
7. Minimum line width < 20 nm
8. Stitching accuracy ≤ 40 nm (mean +3 sigma)
9. Overlay accuracy ≤ 40 nm (mean +3 sigma)

Process capabilities

1. Imaging, Lithography, EBID

Imaging

1. Substrates used: Si, Sapphire, Pt-Si, Glass plate
2. Substrate history: Powdered sample cannot be used, Non-conducting sample need 10~20nm Au/Al coated on them to avoid charging.
3. Substrate size: For surface imaging- small pieces up to 100mm or 4" wafer, for cross sectional imaging at 45deg: (20mmW x 10mmH) at max 90deg: (20mmW x 7mmH)

Lithography

1. Substrates used: same as above
2. Resist used: PMMA (950K, 495K), XR 1541(2%)

Deposition

1. Substrates used: Si (till now)
2. Substrate Size: Small pieces (up to 10 mm) to 2" wafer
3. Materials that can be deposited: Platinum, Tungsten, SiO2
4. Patterned deposition only or pads up to 50um can be deposited depending on the time and precursor availability.