

IEUVI Resist TWG

November 1, 2007

Sapporo, Japan

Albany EUV MET

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Accelerating the next technology revolution.

Outline

- About the EUV Resist Test Center
- Exposure tool overview
- Imaging capabilities
- Support equipment
- Scheduling exposure time

SEMATECH EUV Resist Test Center



- SEMATECH's Resist Test Center (RTC) is located at Albany Nanotech on the University at Albany campus in New York.
- The EUV microexposure tool is the cornerstone of the RTC and is available for use by all SEMATECH member companies and EUV resist suppliers. An Immersion microexposure tool and an immersion interference tool are also available at the RTC.

EUV MET Overview

Source – Xtreme Technologies

- XTS 13-35 DPP source
- 0.5W @ Intermediate Focus (35W in 2π)

Optical System – Carl Zeiss SMT AG

- 0.3NA, 5X Reduction using a Schwarzschild projection lens
- 600um x 600um field size at wafer with 200um x 600um quality area
- Standard annular illumination of 0.36 – 0.55 sigma
- Several illumination conditions possible as shown below:

	Sigma			
	Inner	Outer	Center	Diameter
Large Annular	0.36	0.55		
Small Annular	0.36	0.4		
Dipole			0.42	0.1
On-Axis Quadrapole			0.41	0.1
Off-Axis (45°) Quadrapole			0.43	0.1

(Monopole exposures are also possible with a slight modification)

Throughput

- A typical 11x11 focus exposure matrix takes approximately two hours.
- The length of time is dependant on the required dose and the current state of the source and optical system.
- The use of nonstandard illumination schemes significantly increases the time required per wafer (ie. ~15 minutes/site for monopole illumination).

EUV RTC Overview – Wafer, Reticle, Resist

Wafer

- 200mm notched wafers are used at the EUV RTC.
- There is no need to supply your own wafers as they are provided for your use.
- Imaged wafers are shipped to you upon completion of your experiment or recycled if they are no longer needed.

Reticle

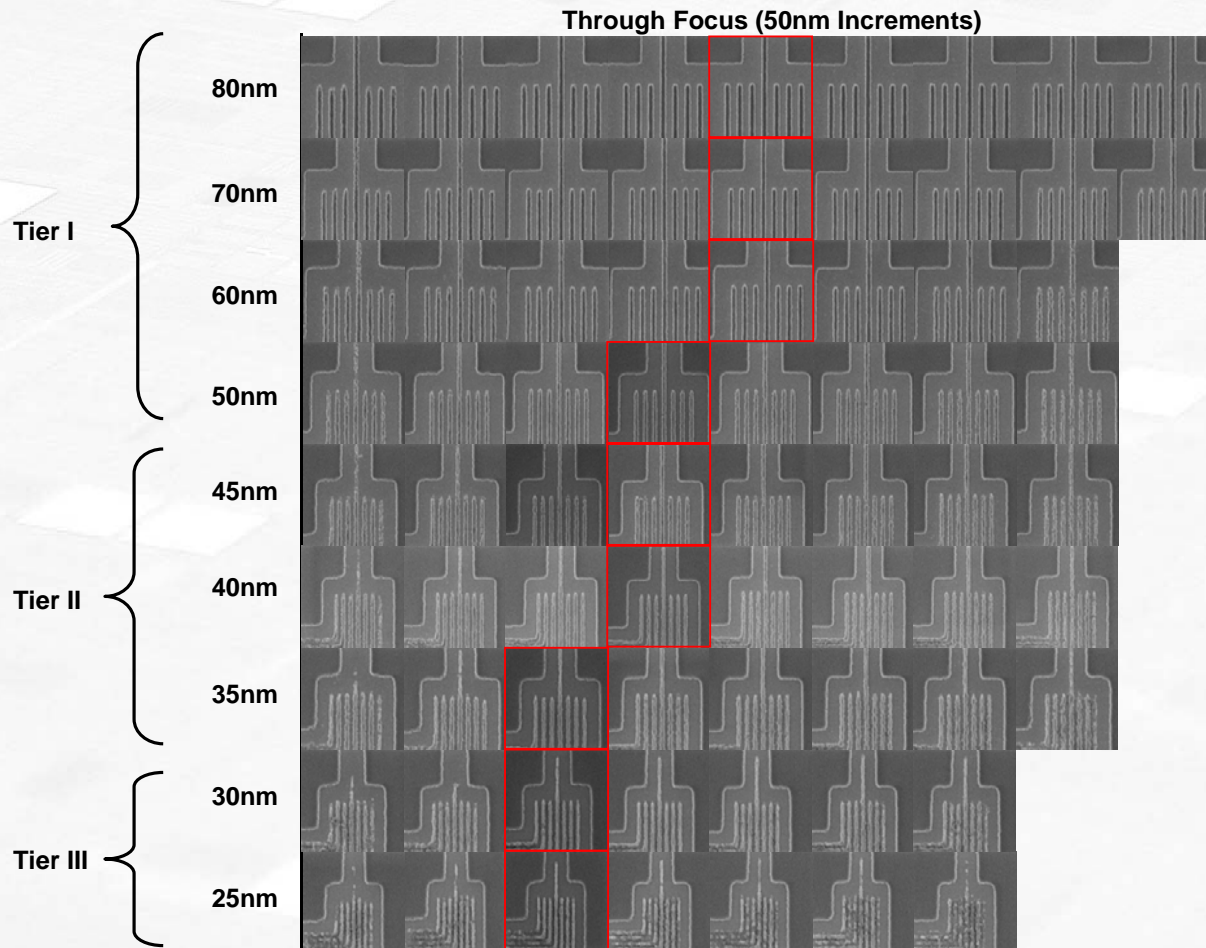
- A reticle is provided that contains a wide assortment of test structures including:
 - lines/spaces, contacts, cleavable features, etc.
- Customer supplied EUV reticles are welcomed although it will take approximately four hours to load and align any reticle.

Resists

- Require MSDS prior to shipment to RTC
- Outgassing requirement:
 - SEMATECH requires that resists outgas less than $6.5E+14$ molecules/cm² as measured by quadrapole mass spectrometry (35-200 amu, excluding 44 amu)

EUV MET Imaging Capabilities

- The EUV MET is currently printing 25nm and larger dense (1:1) line/space and iso features.
 - 2D (horizontal & vertical) and contact printing is currently being optimized and will be available soon.
- Contrast curve exposures are also possible.



Tier I: >50nm Imaging

Tier II: ≥ 35 nm Imaging

Tier III: <35nm Imaging

*TIER I includes contrast curves

Support Equipment

Wafer Processing

- TEL ACT-12 wafer track modified to handle 8” wafers.
 - Linked to exposure tool via a Brooks Automation air/vacuum loadlock
 - Resist and BARC hand dispense capability

Metrology

- Hitachi S9380 CD SEM
- Thermawave Optiprobe for film thickness measurements and characterization
- Misc. material characterization equipment

TEL ACT-12 Wafer Track



Hitachi S9380 CD-SEM



Thermawave Optiprobe



Scheduling Exposure Time

For questions regarding the EUV microexposure tool or to schedule tool time, please contact:

Matt Malloy – EUV Project Engineer

- Phone: 518-956-7134
- Email: matt.malloy@sematech.org

The experiment plan spreadsheet below shows the information that will be needed as well as the various exposure and processing options available.



eMET Experiment
Plan

