



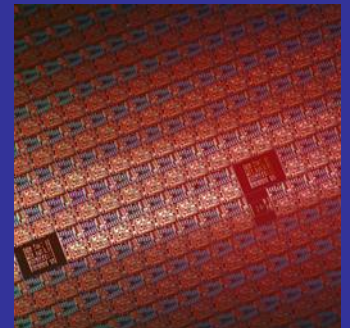
Accelerating the next technology revolution

iEUVi Mask TWG

February 24, 2014, San Jose, CA

Organizing Committee:

*Long He , John Zimmerman , Ota Kazuya ,
Markus Bender , Pawitter Mangat, Obert Wood,
Jim Wiley, Frank Goodwin*



Confidentiality Notice



- **This meeting is by invitation only, but Non-Confidential and open to non-Members.**
- **If proprietary or confidential information is disclosed:**
 - The discloser does so at his/her own risk.
 - The discloser does so with the knowledge that the audience may include non-Members.
 - SEMATECH does not accept presentation materials marked “confidential” or “proprietary” for discussion or distribution.

US Export Compliance



- **U.S. export regulations require Foreign Nationals to sign “Written Assurance” that technical information will not be disclosed to Restricted Countries.***
 - Not required of SEMATECH Member personnel with confirmed registration
- **“Foreign National” means anyone not a U.S. citizen, Legal Permanent Resident, or INS “protected alien”**
- **Foreign Nationals of Restricted Countries* may not attend without SEMATECH Export Manager approval.**
 - Applies to all, including SEMATECH Member personnel

***Restricted Countries:** *Albania, Armenia, Azerbaijan, Belarus, Cambodia, China (PRC), Cuba, Georgia, Iran, Iraq, Kazakhstan, Kyrgyzstan, Laos, Libya, Macau, Moldova, Mongolia, North Korea, Russia, Sudan, Syria, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Vietnam.*

Questions?



- **Please see meeting chair IF:**
 - You are a Foreign National of a Restricted Country.
 - You are a Foreign National who did not sign an Export Written Assurance, unless pre-registered Member employee.
 - You have questions about confidentiality or export requirements.

EUV Focus Areas 2008-2012:

22 nm half-pitch insertion target



2008 / 22hp	2009 / 22hp	2010 / 22hp	2011 / 22hp	2012 / 22hp
1. Long-term source operation with 100 W at IF and 5MJ/day	1. Mask yield & defect inspection/review infrastructure	1. Mask yield & defect inspection/review infrastructure	1. Long-term reliable source operation with 200 W at IF*	1. Long-term reliable source operation with a. 200 W at IF in 2014 b. 500 W-1,000 W in 2016
2. Defect free masks through lifecycle & inspection/review infrastructure	2. Long-term reliable source operation with 200 W at IF	1. Long-term reliable source operation with 200 W at IF	2. Mask yield & defect inspection/review infrastructure	2. Mask yield & defect inspection/review infrastructure
3. Resist resolution, sensitivity & LER met simultaneously	3. Resist resolution, sensitivity & LER met simultaneously	2. Resist resolution, sensitivity & LER met simultaneously	3. Resist resolution, sensitivity & LER met simultaneously	3. Resist resolution, sensitivity & LER met simultaneously
• Reticle protection during storage, handling and use	• EUVL manufacturing integration	• EUVL manufacturing integration	• EUVL manufacturing integration	• EUVL manufacturing integration
• Projection / illuminator optics and mask lifetime				

2012 International EUVL Symposium Steering Committee

Mask TWG Mission & Objective



- **Mission:**

Ensure EUV mask infrastructure is ready for High Volume Manufacturing (HVM) 2013 - 2016

- **Objectives:**

- Identify required standards
- Identify potential gaps between industry's current efforts and projected needs for HVM
- Highlight gaps to member organizations and IEUVI Board for action
- Coordinate industry-wide EUV mask conversion

Meeting Objectives



- **EUV Pellicle**
 - Technical discussions
 - Discussion of supporting infrastructure needs
- **Technical Updates / Discussions**
 - Defect printability, HVM cleaning
 - High NA mask blank requirement
 - SMT NDC update
- **Blank Defect Mitigation**
 - Progress updates
 - Potential gaps for HVM implementation
- **ITRS / Standards**
 - Discussion for 2013 ITRS revision
 - Standards updates

Mask TWG Agenda (February 24, 2013)

1:00 PM	1:15 PM	Introduction	Long He (SMT/INTC)	1
		1. EUV Pellicle		
1:15 PM	1:40 PM	EUV Pellicle technical discussion	Hye-Keun Oh (Hanyang Univ)	2
1:40 PM	2:05 PM	EUV Pellicle technical discussion	Shoji Akiyama (Shin-Etsu)	3
2:05 PM	2:20 PM	Discussions: Qual / requal of pellicled-mask - Inspection method, membrane type, pellicle type / mounting Built-in pellicle (in-tool) Required infrastructure changes	All	4
		2. Technical Updates / Discussions		
2:20 PM	2:40 PM	SEMATECH defect printability studies	Mason Jang (SMT/SAMSUNG)	5
2:40 PM	2:55 PM	Remaining challenges of EUV mask cleaning for HVM	Uwe Dietze (SUSS)	6
		----- Break -----		
3:10 PM	3:25 PM	High NA EUV mask blank simulation studies	Patrick Kearney (SMT)	7
3:25 PM	3:35 PM	SEMATECH High-NA Actinic Reticle Review Project (SHARP) update	Iacopo Mochi / Kenneth Goldberg (LBNL)	8
3:35 PM	3:45 PM	SEMATECH Nano Defect Center program update	Vibhu Jindal (SMT)	9
		3. Blank Defect Mitigation		
3:45 PM	3:55 PM	Fiducial development update	Tsutomu Shoki (Hoya)	10
3:55 PM	4:05 PM	Fiducial development update	Yoshiaki Ikuta (AGC)	11
4:05 PM	4:15 PM	e-beam algorism and implementation update	Shusuke Yoshitake (Nuflare)	12
4:15 PM	4:30 PM	Defectivity mitigation process flow and potential gaps	Markus Bender (AMTC)	13
		4. Mask ITRS Review and Standards Updates		
4:30 PM	4:40 PM	Mask ITRS Review	Frank Goodwin (SMT)	14
4:40 PM	4:45 PM	P37 standard voting results	John Zimmerman (ASML)	15
4:45 PM	4:50 PM	E152 status update	Long He / Handling TF	16
4:50 PM	4:55 PM	P48 fiducial mark specification update	Long He / Fiducial TF	17
4:55 PM	5:00 PM	Conclusion / adjourn	Long He	18

Round Table Introduction

- Please introduce yourself by identifying
 - Your name, and
 - Organizational affiliation

**Friendly Reminder:
Please put your cell phone in silent mode during the
meeting.**