EUVL Activities in China

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June 13, 2013 HI
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Refer to the published information.

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• **NSFC:** National Natural Science Foundation of China.

• **NBRFC:** National Basic Research Program of China.

• **NSTMP:** National Science and Technology Major Project.

• **MOE:** Ministry of Education
Overview

2-Mirror Small tool

EUV source

Optics: Design and ML

EUV resist

Metrology

R & D Status

Activities in Chinese Academy of Sciences and some Universities.

Supported by Government.

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System

2-Mirror system
NA0.1, LPP source.

Resist pattern: 250nm.

In Changcun Institute of Optics, Fine Mechanics and Physics (CIOMP) of CAS.

Supported by NSFC.

EUVL Optics

1. EUVL Optical Design

4M, 6M, 8M projection optics

Field: 26mmx1.5mm

Illumination (OAI, CI)

Activities in Beijing Institute of Technology (BIT)

Supported by NSTMP & MOE.


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2. Mo/Si- ML coating

Reflectivity 65%,

Activities in CIOMP (CAS)

3. Co/Mg/Co/B\textsubscript{4}C & Al(Si)/Zr ML coating

Activities in Tongji Univ., but not for EUVL.
Supported by NBRPC, NSFC, Sci. & Tech Cooperation project of China and Japan.
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Metrology in BIT

Supported by NSTMP, NSFC, MOE.

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Absolute measurement accuracy: $5 \text{ nm rms.}$
Measurement repeatability: $0.55 \text{ nm rms.}$
Measurement Speed: $20\text{s/field point.}$

Metrology in CIOMP

PS/PID, measurement repeatability: 0.31nm rms

Visible light


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EUV Source

1. In Shanghai Inst. of Opt. & Fine Mech. (SIOM)

“Experimental study on extreme ultraviolet light generation from high power laser-irradiated tin slab*”


2. In Harbin Institute of Technology

“Experimental study on main pulse power supply for discharge produced plasma extreme ultraviolet source”.

Ref. HIGH POWER LASER AND PARTICLE BEAMS, 2 (2010).
3. In Huazhong Univ. of Sci. & Tech

“Research of collector mirrors of C0\textsubscript{2} laser produced plasma EUV source”.


“Characteristics of Ion Debris from Laser Produced Tin Plasma in Ambient Gas and Magnetic Field (P11)”.

Ref. EUVL workshop 2013 Hawaii.
4. In Changchun University of Sci. and Tech.

“Characteristics of ion debris from laser-produced tin plasma and mitigation of energetic ions by ambient gas”.

Supported by NSFC, NBRPC
EUV Resist

CD ~30-32nm

LER < 2nm

Interference pattern using Shanghai Synchrotron source

Activities in the Ins. of Chem. of CAS.
Supported by NSTMP.
Using PROLITH, Caliber, CODE V, Light Tools and BIT program to accomplish our activities.

- CODE V, Light Tools
- Launch mass simulations
- Joint work
- Multi-issues impact on lithography
- Verify Algorithms, Co-design and optimization

Lithography Simulation in BIT
BIT: Co-optimization of lithography

- Co-optimize stepper, resist process & mask
More activities will be shown in the future!

Thank you very much for your attention