Excellent & Reliable

E & R ENGINEERING CORPORATION (8027)

General Information

- *Found:1994.10.28
- *Capital:797,828K NTD (~26 Million USD)
- *Operation Sites:
- *Head Quarter: Kaohsiung, Taiwan
- *Taipei Factory: Taipei, Taiwan
- *Shanghai Sales office: Shanghai , China.
- *Dong Guan Factory: Guan Dong , China.
- *Wuxi Factory: Wuxi, China

History & Achievements

- 1994 : E&R was established
- 1996 : Fully automatic IC laser marking machine, BLAZON-1600, was launched
- 1998 : Plasma Cleaner, Plasmax-800, for BGA applications, was launched
- 1998 : Business of carrier tape for SMD was start-up
- 2001 : Awarded by Philips semiconductor as the best supplier of equipment
- 2003 : Awarded by OSE as the best supplier of equipment
- 2007 : Awarded by Philips semiconductor as the best supplier of carrier tape
- 2008 : Market share of IC laser marking equipment was number one in Taiwan
- 2008 : Market share of carrier tape was number one in China
- 2009 : Pioneer of laser micromachining for applications of Silicon, ITO, ceramics and glass
- 2010 : Awarded by ASE as the best supplier of equipment
- 2014 : The only supplier of laser machine to the worldwide leading company of smart watch
- 2015 : IPO in Taipei Exchange
- 2016~ : Laser wafer marker , laser wafer cutting machine ,microwave plasma cleaner was launched

Company Scope (1)

E& R Kaohsiung Taiwan

- Semiconductor Equipment: Laser Marker, Plasma Cleaner, SIP Laser cutting M/C. Laser Wafer cutting machine .
- FPC Equipment: Laser cutting/Drilling M/C, Film Laminators, Roll to Roll Handling system.
- LED Equipment : plasma cleaner, Ceramic Laser Driller, Ceramic Laser Marking M/C.
- Display Equipment: Laser patterning M/C, Laser Glass cutting M/C.

Company Scope (2)

E& R Taipei

- FPC (Flexible printing Circuit Board) and module manufacturing and sales

E& R Shanghai

- Sales and Services, China

E& R Dong-Guan

- Carrier Tape Manufacturing and Sales

E& R Wuxi

- Carrier Tape Manufacturing and Sales

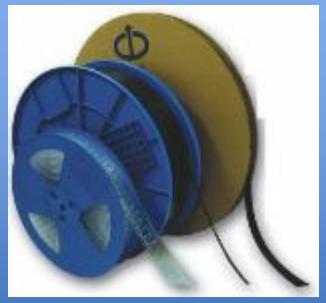
Product Introduction

Laser Equipment

Plasma Equipment

Core Technologies

SMD Packing Materials



FPC Equipment

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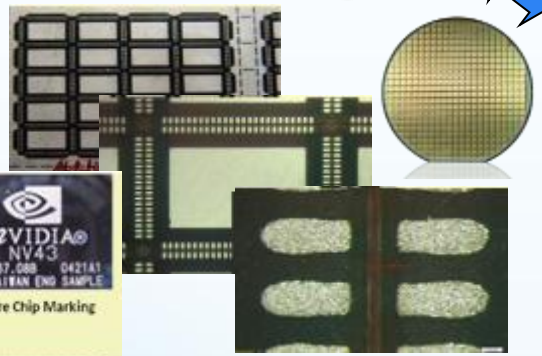
Laser Development Products Application

	Products	Application
1	Laser Strip Marker	IC Marking for final product.
2	Laser wafer marker	IC Marking for in-process traceability.
3	Laser Package cutting Machine	Cut the whole substrate into individual units.
4	FPC Laser Cutting Machine	FPC cutting
5	Laser Wafer Scribing/Cutting Machine	Cut the whole wafer into individual units.

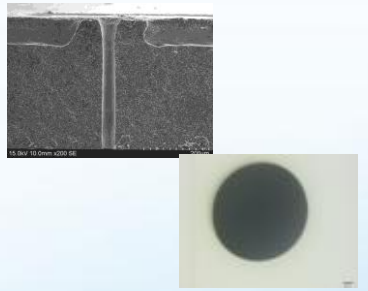
Key application, Laser

•Cutting / Scribing
•Marking

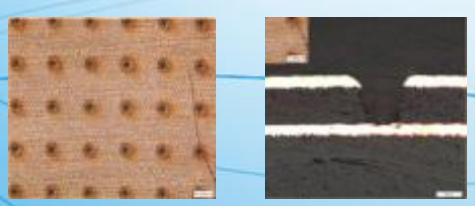


Semiconductor | LED | Application | FPC/HDI | Panel

•Ceramic Substrate
•Cutting/scribing
•Micro via drilling



•Micro via drilling
•Cutting



•Sapphire cutting
•glass cutting
•ITO patterning

Laser Wafer Cutting Machine

Laser Wafer Marking Machine

Laser FPC Rapid Cut-L200D

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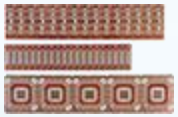
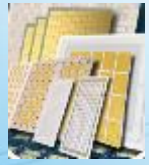
Plasma Development Products Application

	Products	Application
1	Batch Type RF Cleaner	Surface activation, Remove metal oxide, improve bondability
2	IN-Line RF Cleaner	Surface activation, Remove metal oxide, improve bondability
3	Microwave Plasma Cleaner	Surface activation, Remove metal oxide, improve bondability
4	Microwave Etcher De-flash、Descum	Remove epoxy residue , Remove PR residue.
5	Microwave Plasma Dicing/THIN	Cut the whole wafer into individual units

Key application, plasma





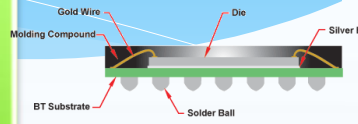
Batch type,800A

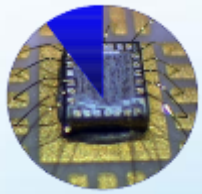
Batch type,800C

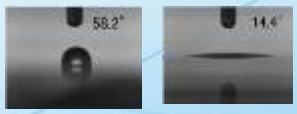
Application

Pannel type 600S

strip to strip type 600







Contact Angel Before and After

LF, RF and Micro-Wave all available for request

Microwave Plasma Cleaner Plasmax-MW 300

FPC Equipment

Roll to Roll Handling Equipment

FPC Cu Wet Etching

FPC

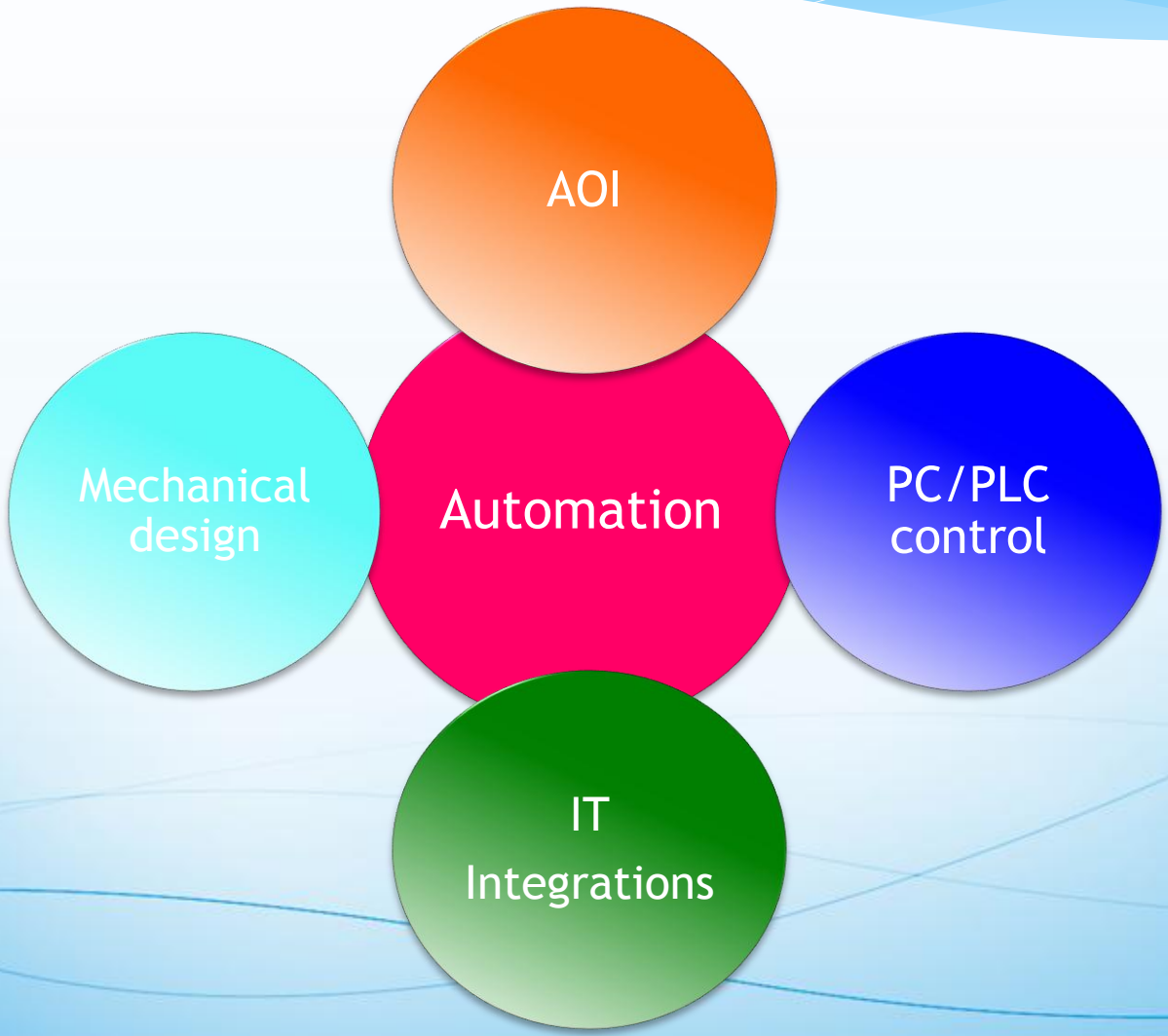
PCB AOI Inspection

Film Laminator

Core Technical

- Automation of E&R
- IT Integrations

Automation of E&R

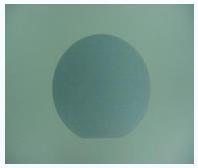


New Technology For Wafer Level

Wafer Back Side Marker for 8”/12”

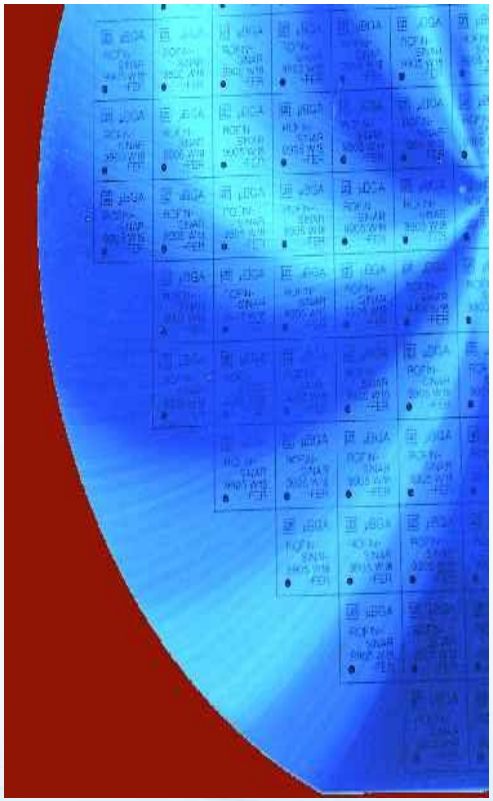
Silicon Wafer

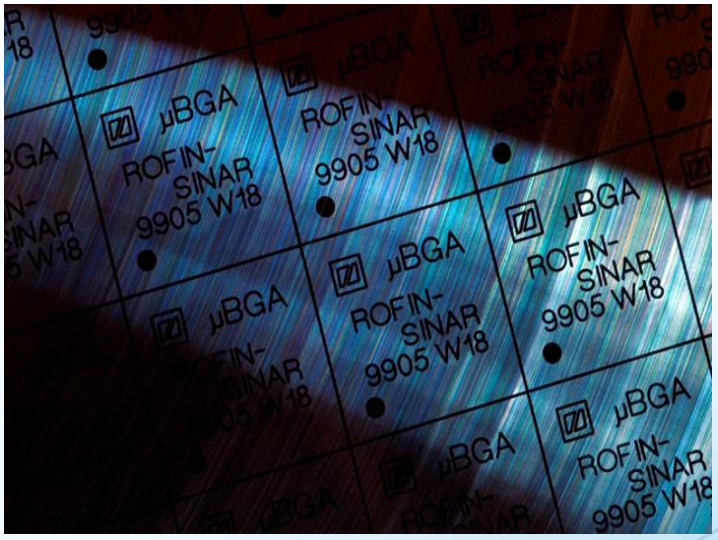
8”, 12” black coated wafer



6”, 8” mesh wafer

6”, 8” thin metal coated wafer





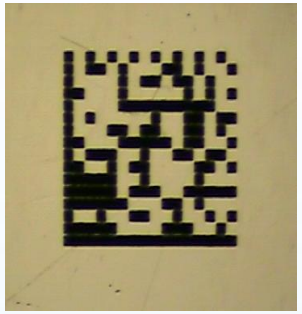
12” gold coated wafer

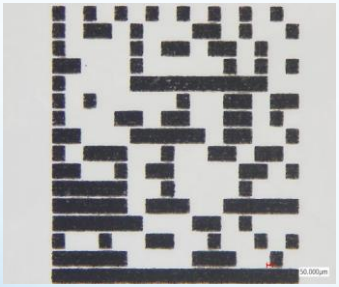
8”, 12” SIN Silicon wafer

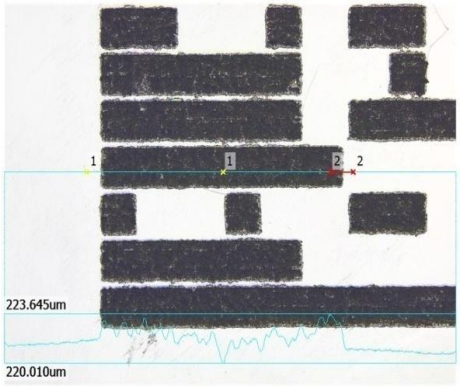
8”, 12” polish silicon with tape before marking

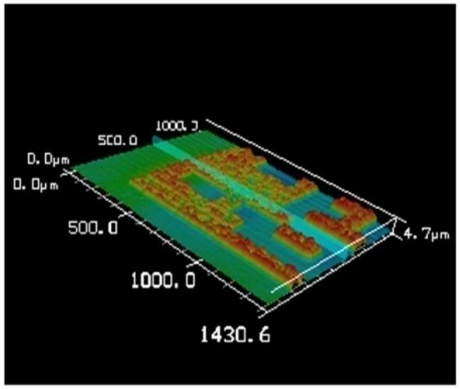
8”, 12” bare Si grinded

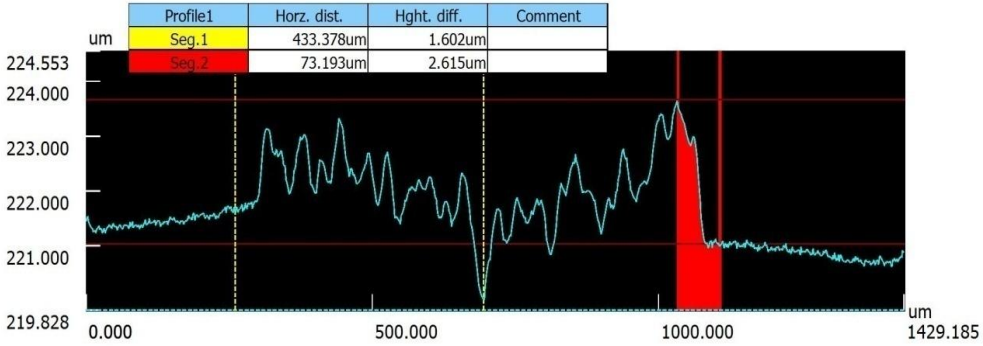
Wafer Marker for 8” Glass Substrate





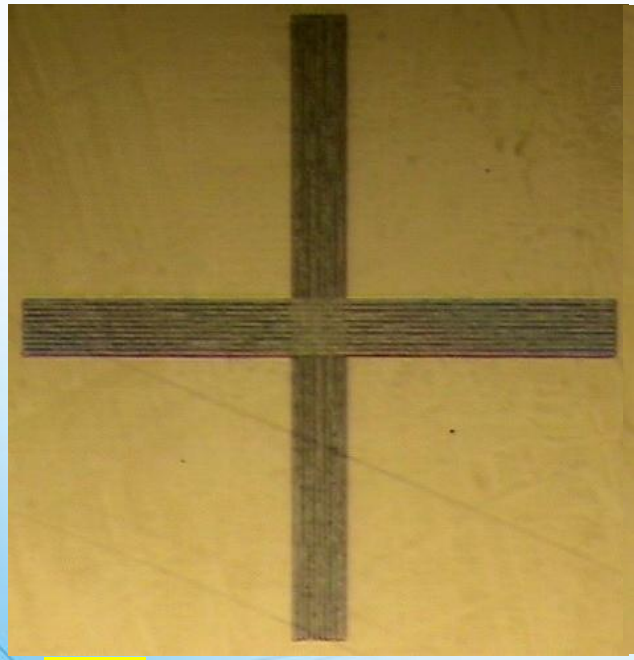






1. 2x2 2D - Full Type And Good Reading from 2D
2. No “HAZ” and slag found

Glass Inner Alignment Mark



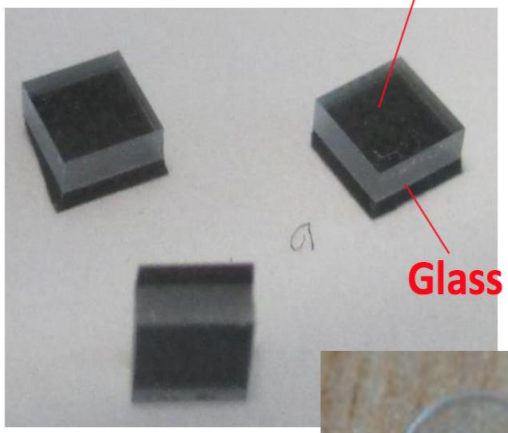
3X

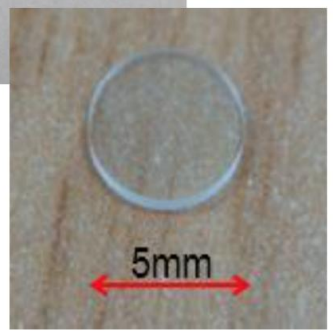
3X

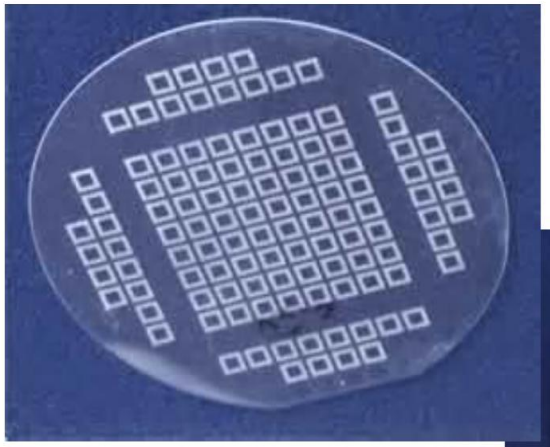
Wafer Cutting & Scribing

Wafer Level cutting & Scribing

- Straight & round cut trajectories
- Cutting speed : >200mm/sec, straight edge
- Chipping : <10um, straight edge
- Roughness, sidewall : Ra <1um
- Thickness of glass : 0.3~1.1mm







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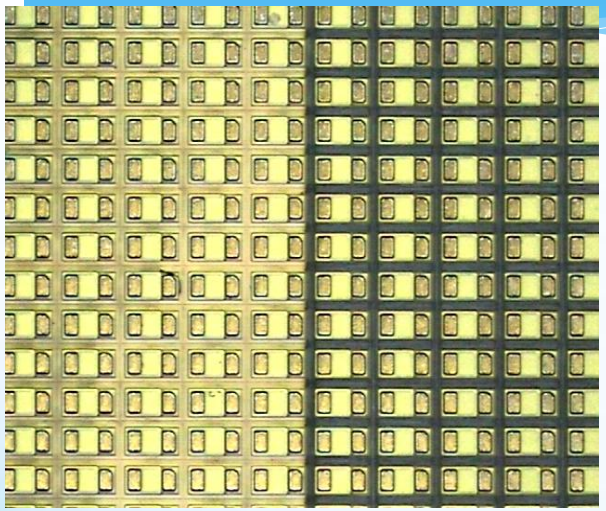
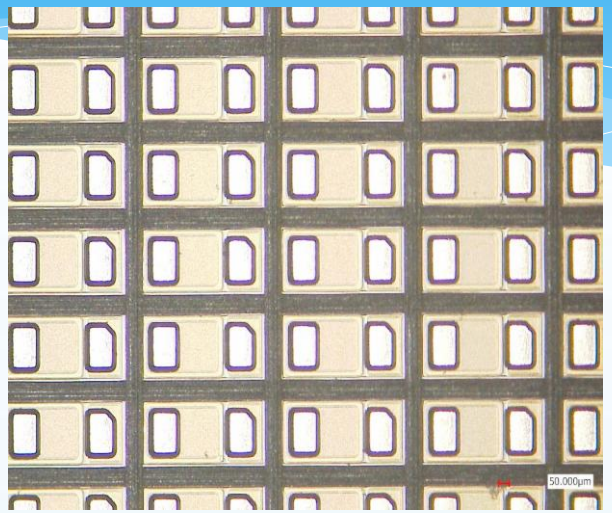
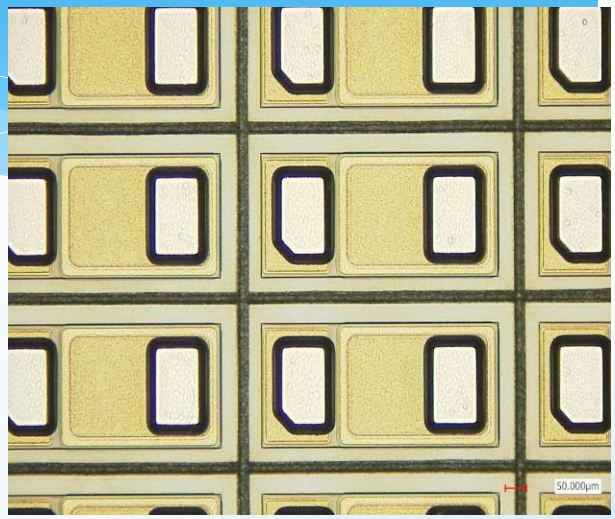
Wafer Level cutting & Scribing



- Die Size : 1.1x0.7mm
- Dicing street : 90um



Scribing speed (mm/sec)	184
Trench width(um)	76.4
Trench depth(um)	2.3



Scribing speed (mm/sec)	990
Trench width(um)	17
Trench depth(um)	2.4

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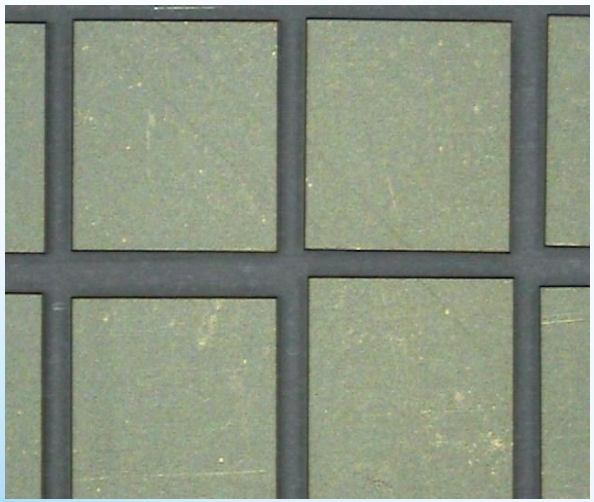
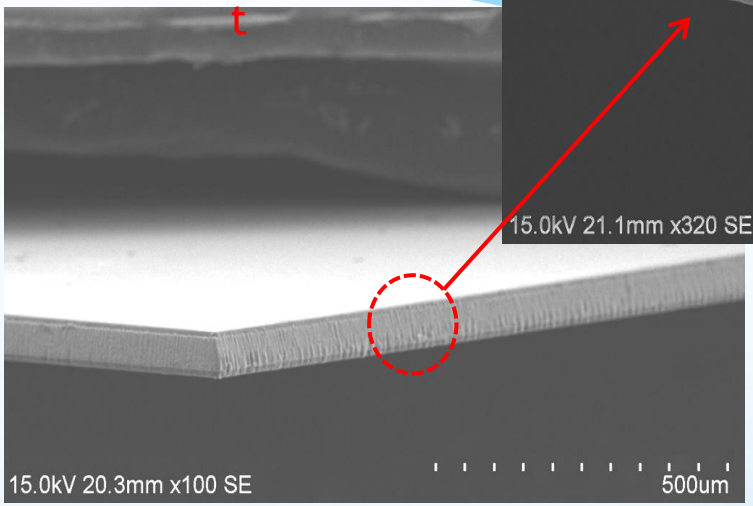
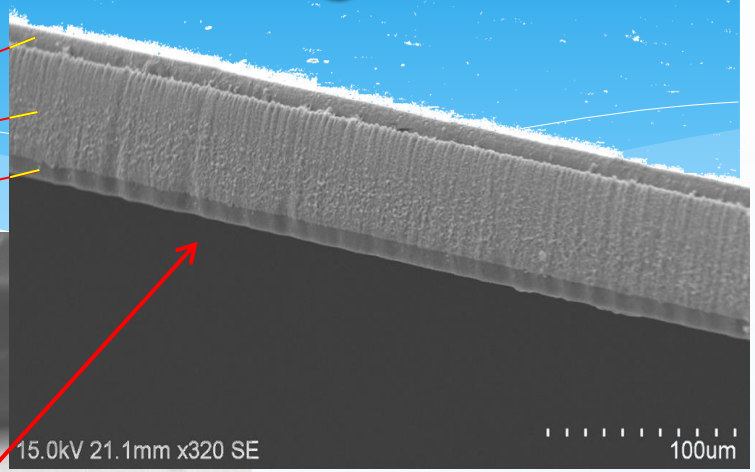
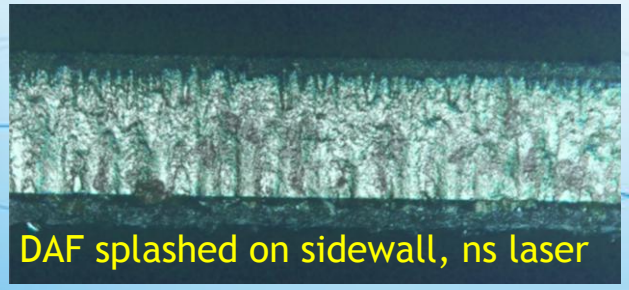
Wafer Level cutting & Scribing

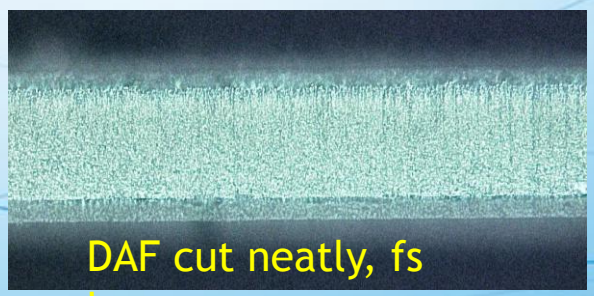
- Si cutting speed : >150 mm/s
- roughness : Ra < 1um











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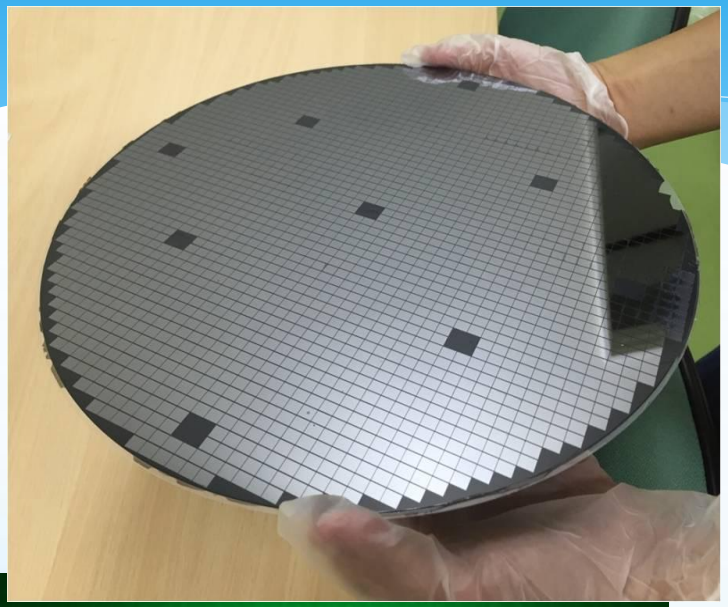
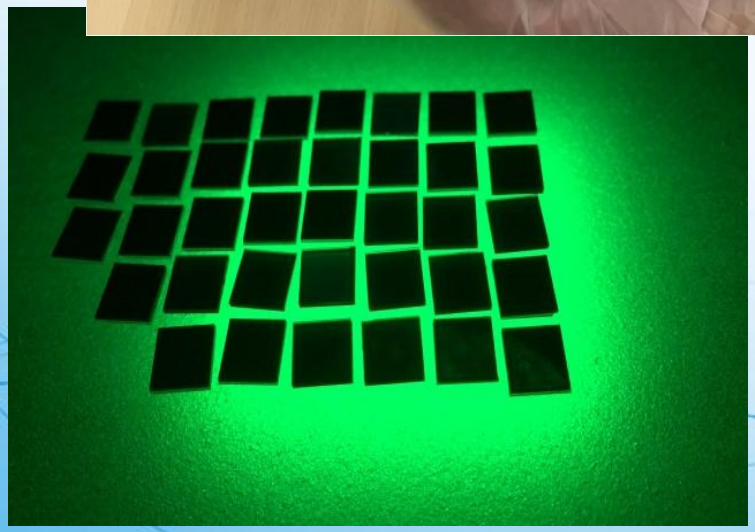
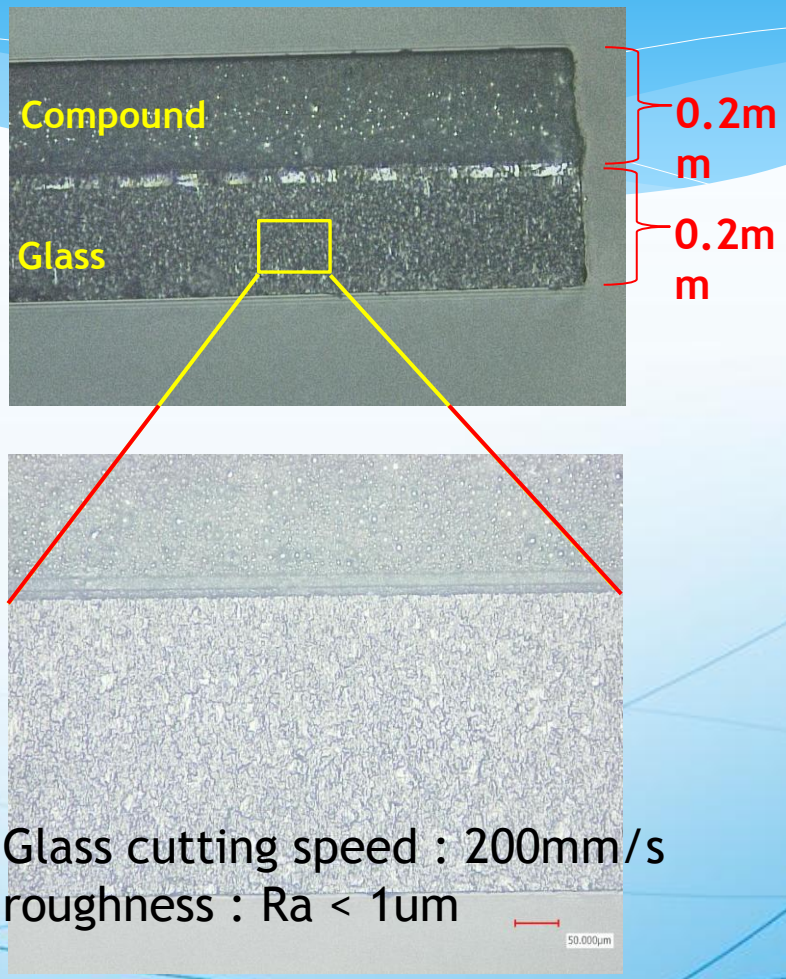
Internal Scribing .. Fan-out wafer







- Glass cutting speed : 200mm/s
- roughness : Ra < 1um

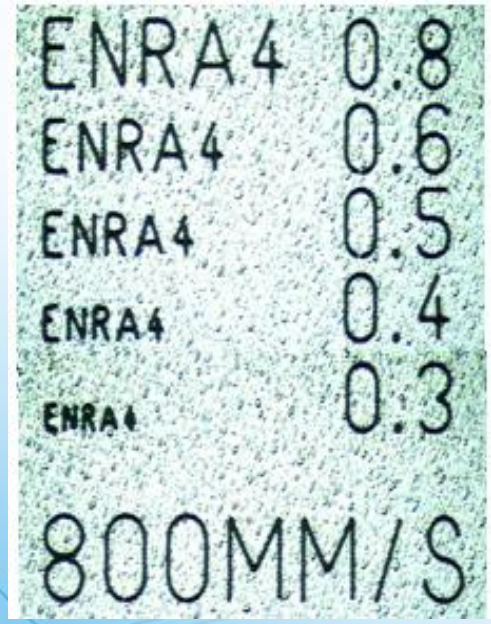
Wafer Marking

Wafer Laser Marking

- Features
  - ✓ Chip marking & Wafer ID marking
  - ✓ Through tape marking
  - ✓ Bare wafer marking : Grinding/Polishing & metal surface
  - ✓ Warpage eliminator

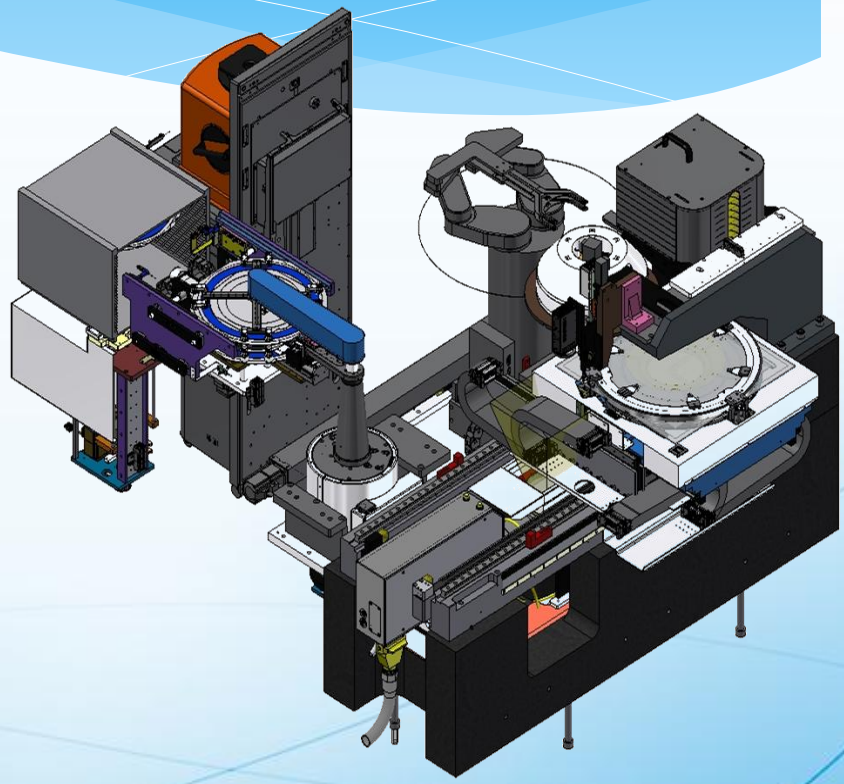
Wafer Laser Marking

- Through-tape marking



Before tape remove

After tape remove



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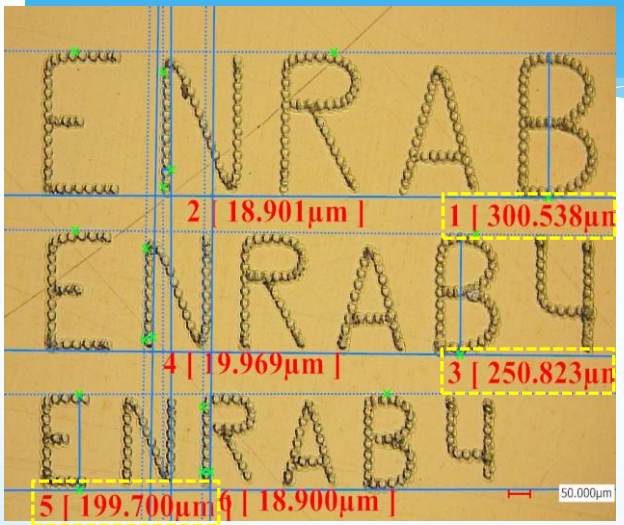
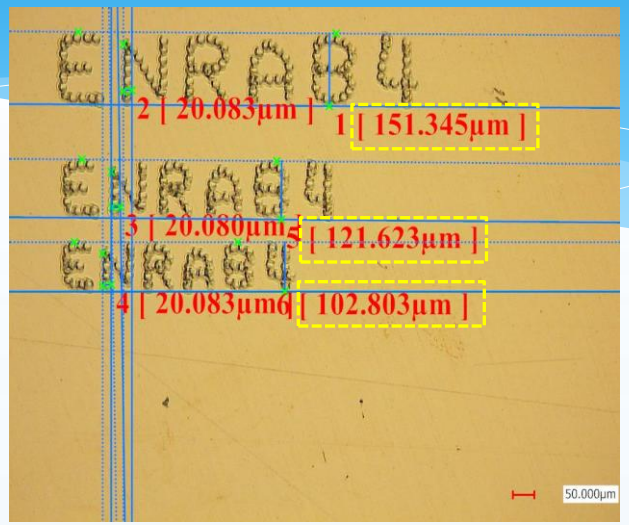
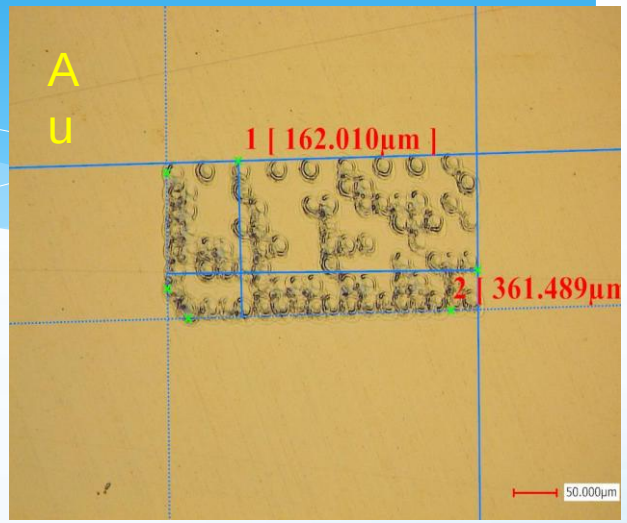
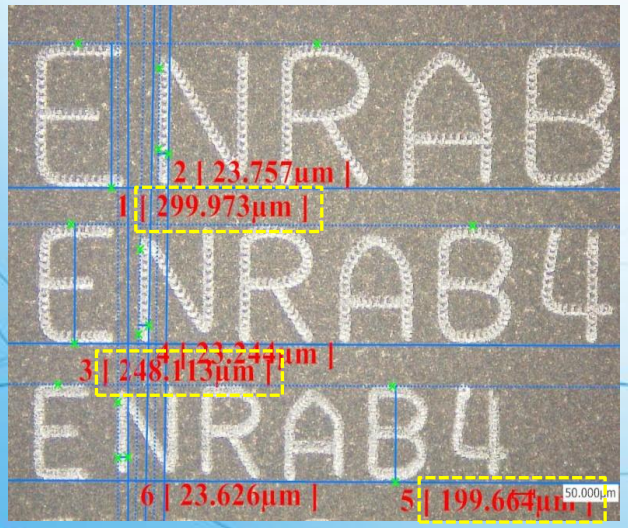
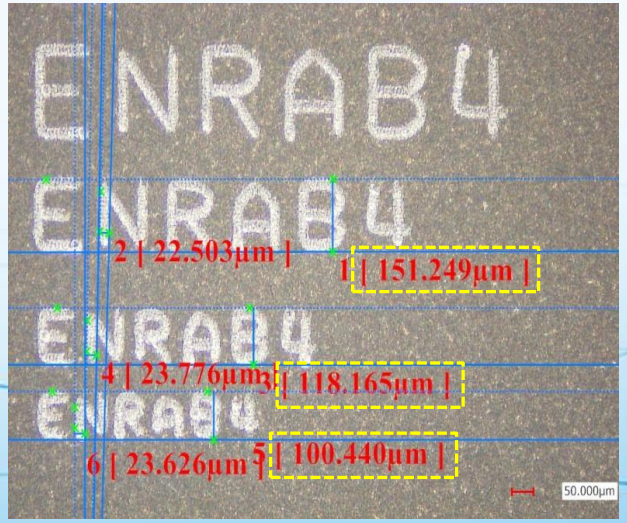
Wafer Laser Marking .. Tiny Character - 0.1mm

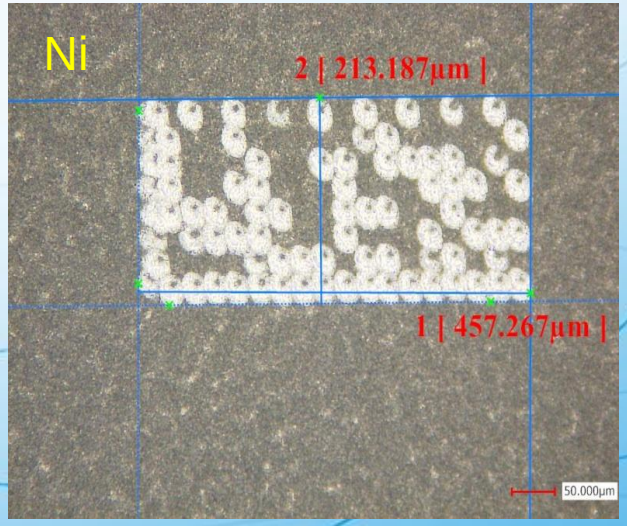












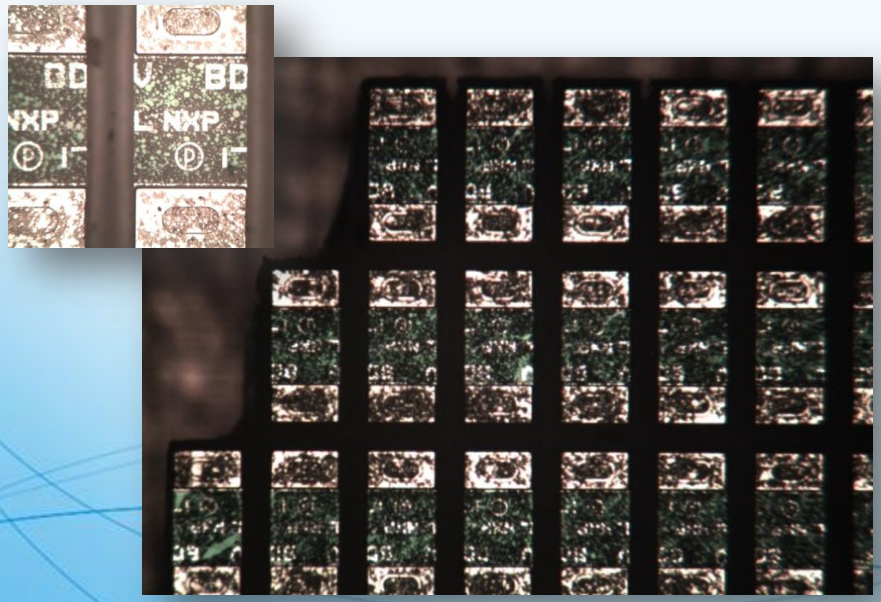
Wafer Plasma

Equipment overview

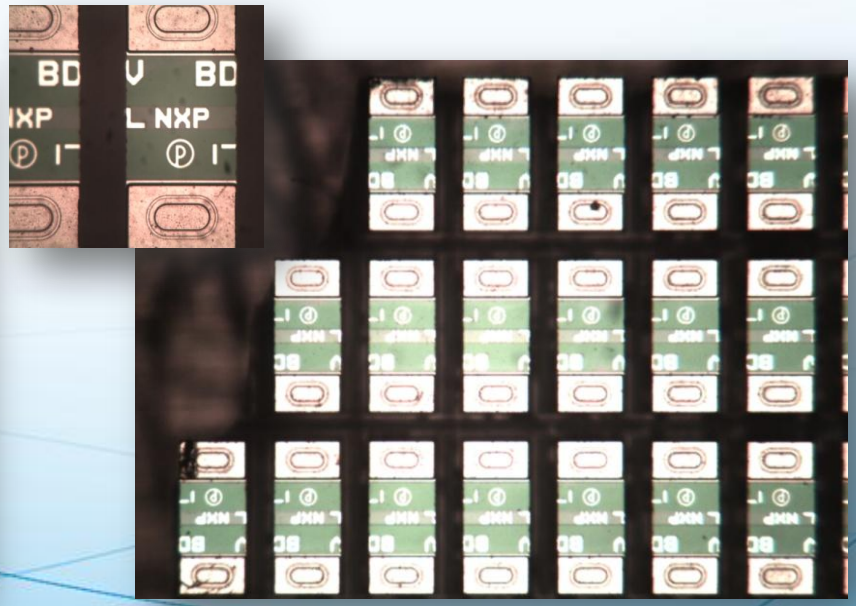
CRM-300R

Compound Residue Removal - substrate

Residue must be thoroughly removed from bumps, but still keep dicing streets fully covered with compound.



Before plasma



After plasma

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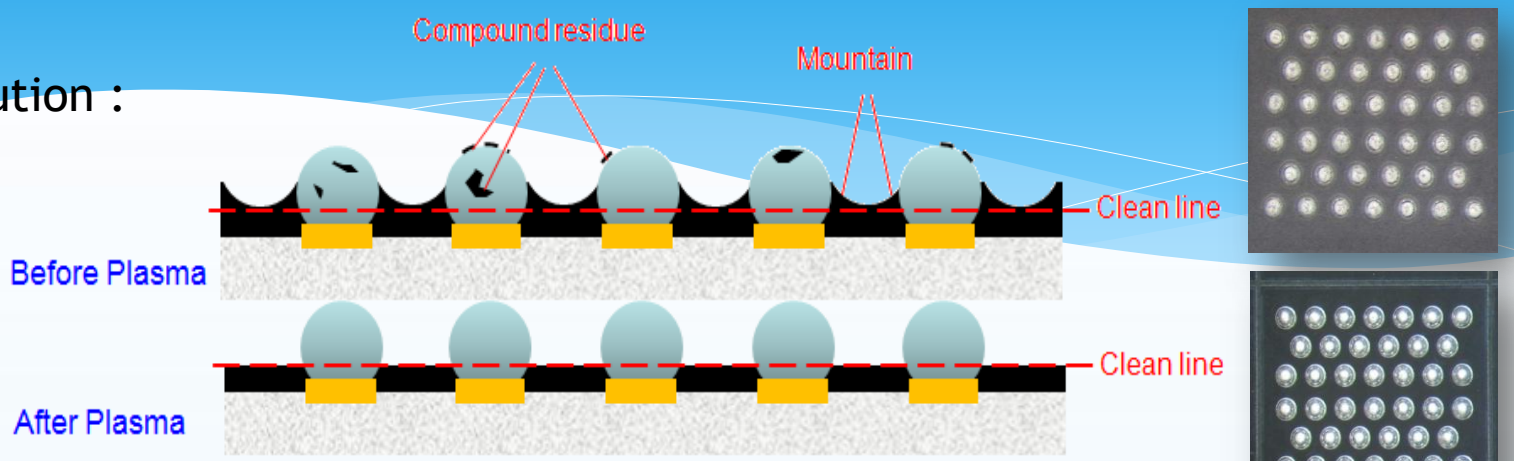
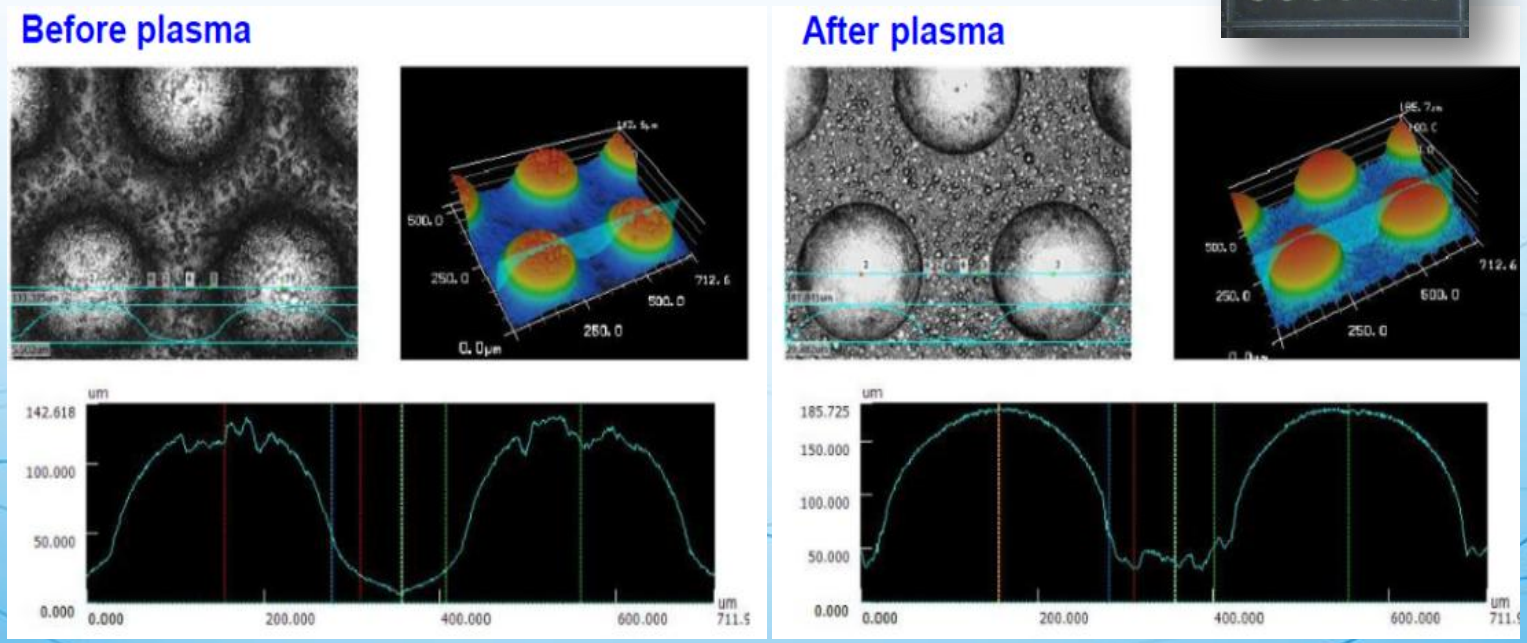
Compound Residue Removal - Bumping wafer

Solution :

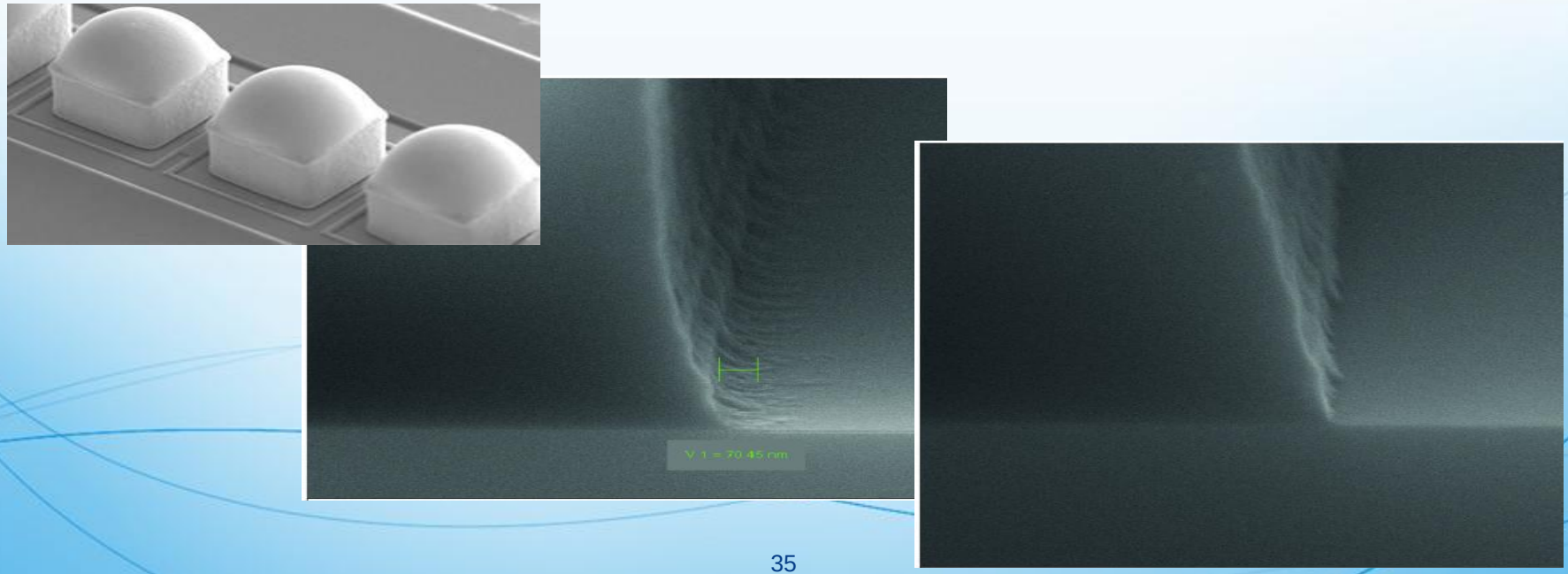




Compound Residue Removal – Copper Pillar

⊙ For bumping process of **copper pillar**, photoresist residue can't be fully removed by wet chemicals and remains on the UBM pads . These residue will impede the subsequent copper electroplating process and cause defects.

CRM-300 Series can fully remove residue to raise the yield of copper pillar bumping, through **descum** process.



~THANK YOU ~