

## UBM (Under Barrier Metallization) process for Al electrode on wafer

# TORYZA EL PROCESS

- Prevent local corrosion and nickel spike in pretreatment process for Al sputtering film
- Electroless nickel plating for high-temperature mounting and use
- Okuno can sell automatic electroless plating equipment applicable to 12 inch wafer

Cleaning/etching  
**TORYZA ALC W**

Surface conditioning  
**TORYZA CD W**

De-smutting  
**TORYZA DS W**

1<sup>st</sup> zincate  
**TORYZA AZ W**

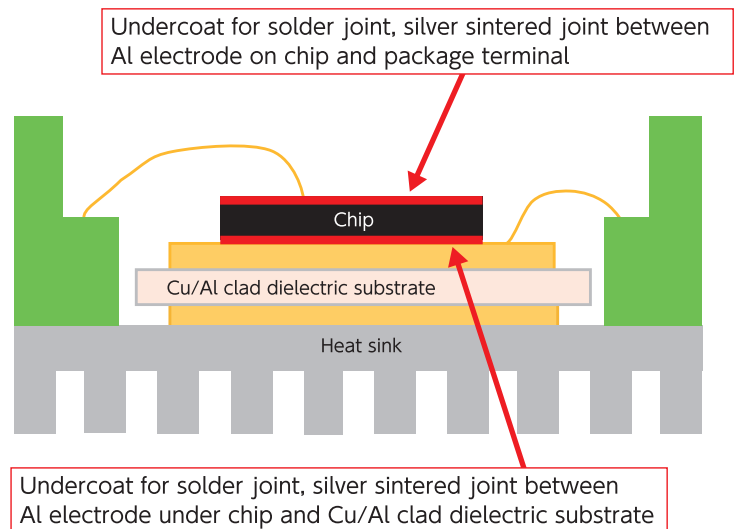
Zincate Stripping  
**TORYZA DS W**

2<sup>nd</sup> zincate  
**TORYZA ZN W**

Electroless Ni plating  
**TORYZA NCR HRC**

(Electroless Pd plating)  
**(TORYZA PD LP)**

Electroless Au plating  
**TORYZA FG SR**



## Automatic electroless plating equipment Applicable to 12 inch wafer

Overall picture



Automatic open/close lid

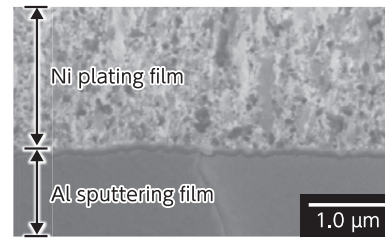
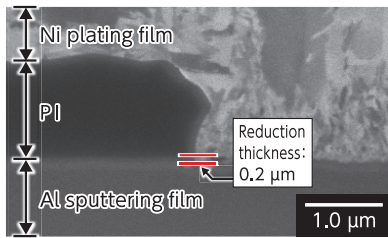


- Applicable to 6, 8, 12 inch wafer
- 25 pieces, full career, 2 lines
- Cleanroom Class 1000
- Equipped with automatic recording system for production management and production monitoring

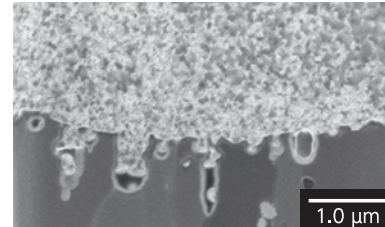
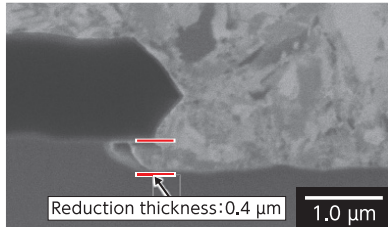
# Reduce etching amount and local corrosion of Al sputtering film

Cross sectional view (After electroless Ni plating)

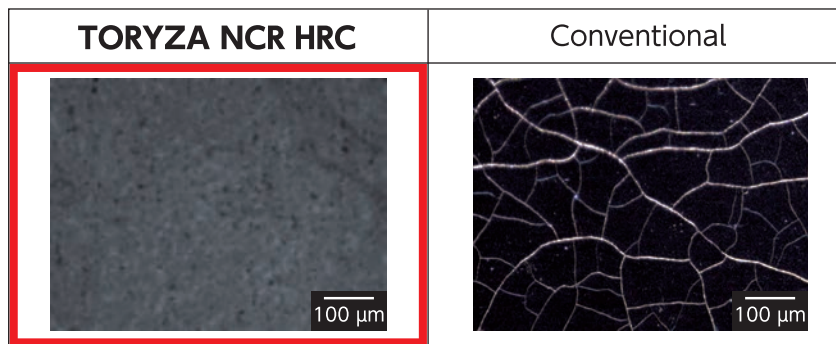
## TORYZA EL PROCESS



## Conventional



# Electroless Ni plating film applicable to high temperature jointing



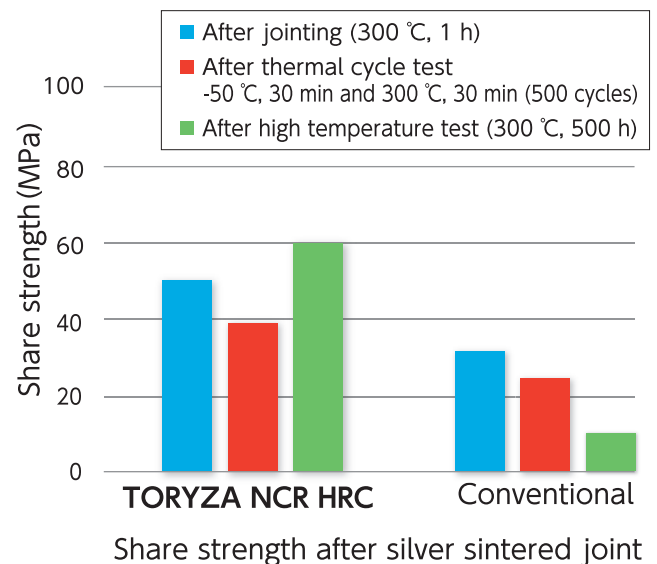
Indentation test by Erichsen tester (Ni thickness 3 μm, indentation width: 0.5 mm)

**Prevent cracks after 400 °C heat treatment**

# Electroless Ni plating film to endure high-temperature environment

Crack occurrence comparison of electroless Ni plating film

Electroless Ni plating film	Crack occurrence		
	After heat treatment	After thermal cycle	After high temperature test
<b>TORYZA NCR HRC</b>	<b>No</b>	<b>No</b>	<b>No</b>
Conventional	No	Occur	Occur



Presented by SANKEN,  
 Osaka University Flexible 3D JISSO Collaborative Research Institute  
 SiC Chip: Ti sputtering on SiC chip, and form Ag sputtering layer  
 Jointing condition: Electroless Ni plating (7 μm thickness) on DBA substrate and sintering SiC chip on DBA substrate with Ag paste (Sintering condition: 1 MPa, 300 °C, 1 h)