AIR PRODUCTS

CVInc. Test & Advanced Packaging

Clean the WAFER, NOT the PROBE CARD!

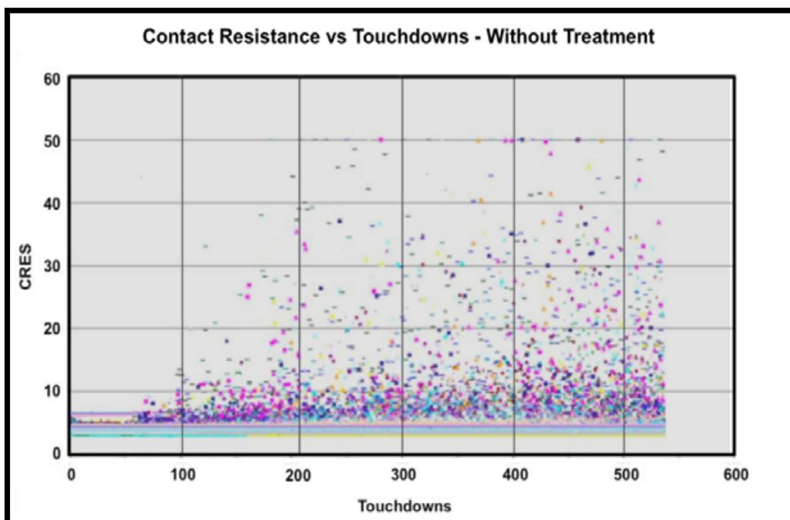
Remove oxides that cause high contact resistance!

BPS Products

- *Remove oxides from pads and bumps of Al, Cu, and Sn/Pb*
- *Cause minimal etching of base metals, substrates such as Si, GaAs, InP and passivation layers.*

BPS-100 Aluminum Oxide and Residue Remover

BPS-100 removes oxide and organic residue from Al pads with a 5-minute cycle time

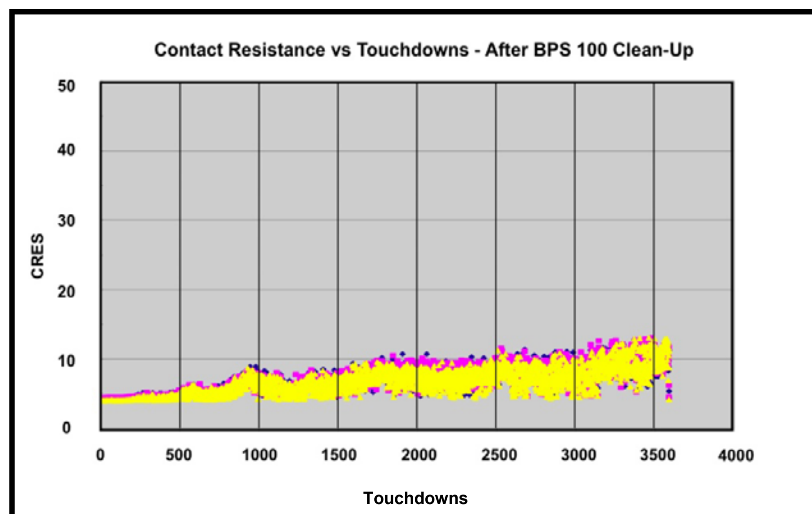


Probe Results on Wafers WITHOUT Treatment

- **Contact resistance distribution degrades with # touchdowns, note lack of control at 75 to 100 touchdowns**
- **~ 500 touchdowns between cleans**

Probe Results on Wafers AFTER Treatment with BPS-100

- **3600 touchdowns across multiple wafers, customer requirement not to exceed 15 ohms**
- **Tighter contact resistance distribution, ~ 7x more touchdowns between cleans**
- **➔ longer probe card life**



Removal of Al Oxide and Organic Residue Using BPS-100 @ 25°C for 5 Minutes:
EDX Results on Al Bond Pads

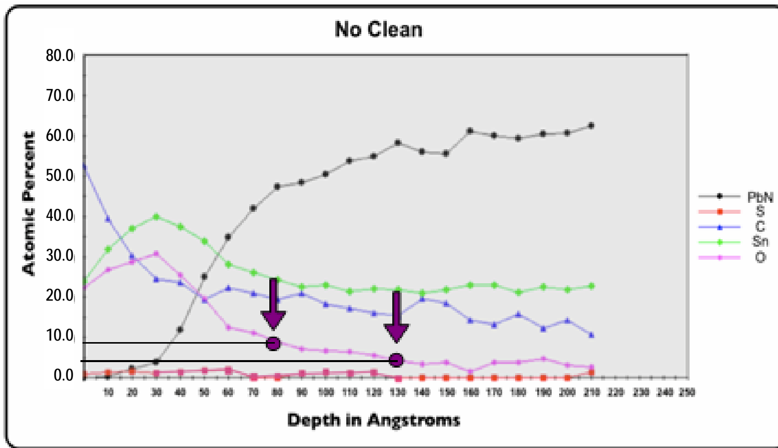
Al Bond Pad Treatment	Atomic % by Element				
	C	O	Cu	Al	Si
Without	16.17	8.97	3.64	61.46	9.76
After	0	0	4.19	93.45	2.36

AIR PRODUCTS

CVInc. Test & Advanced Packaging

BPS-172 Metal Oxide Remover

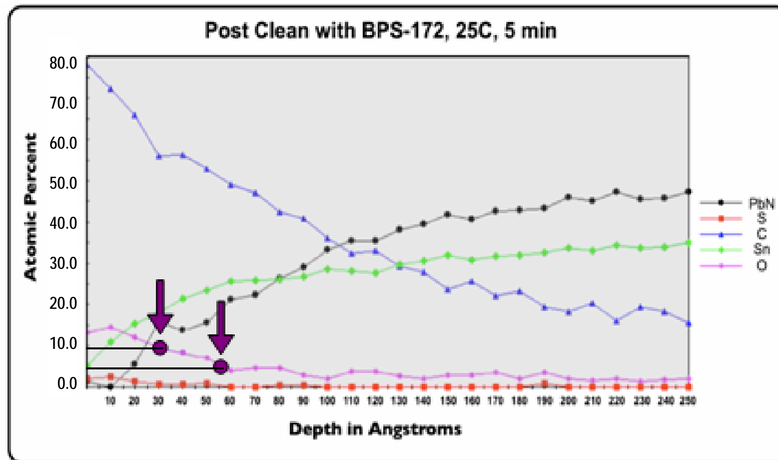
Oxide Reduction on WLCSP Sn/Pb Bumped Die



Before Cleaning:

Recently processed wafers with 10% level reached at 80 Å and 5% level at 130 Å

Area under oxygen curve is high



Wafers cleaned with BPS-172:

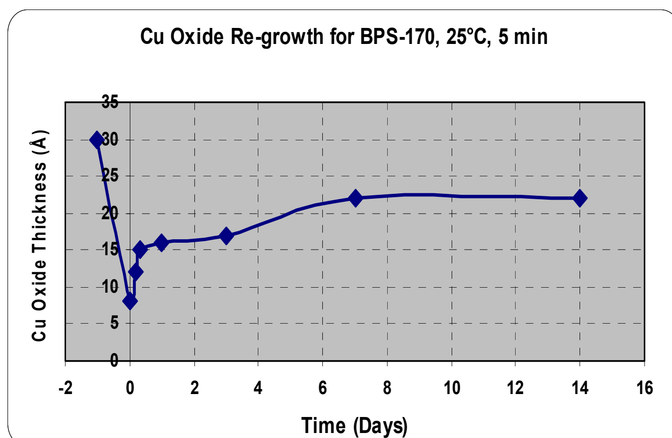
10% level reached at 30 Å and 5% level around 55 Å

O_2 levels lowered by ~ 70% compared with no clean.

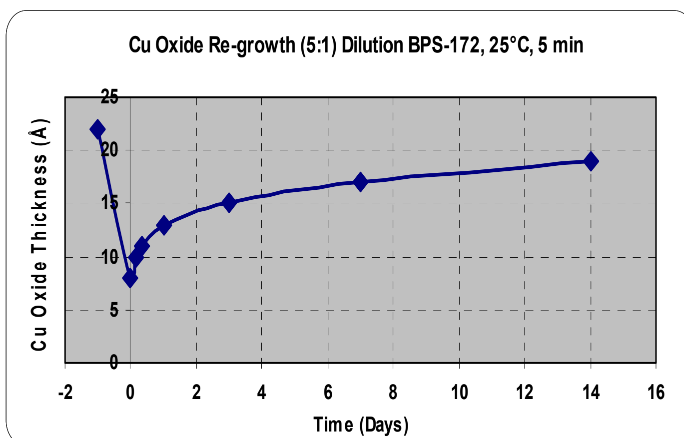
Oxide levels determined by Auger milling to 250 Å depth

BPS-170 (optimized for spray tools) and BPS-172 (optimized for wet benches) Metal Oxide Removers

Remove Copper Oxides and Minimize Oxide Re-growth



Initial oxide thickness ~ 30 Å
After treatment ~ 7 Å
After 2 weeks ~ 22 Å



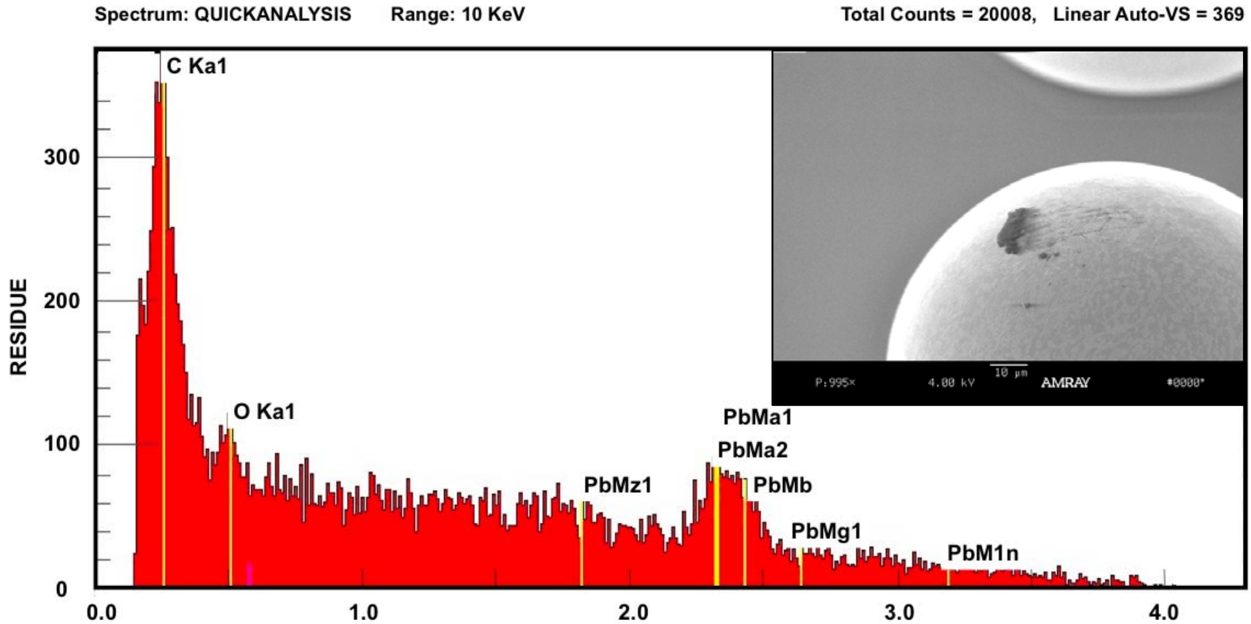
Initial oxide thickness ~ 23 Å
After treatment ~ 7 Å
After 2 weeks ~ 18 Å

AIR PRODUCTS

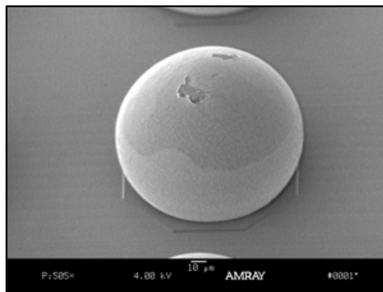
CVInc. Test & Advanced Packaging

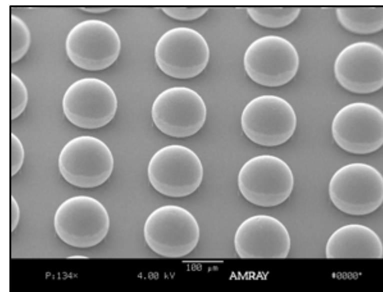
BPS-125 Flux and Photoresist Remover

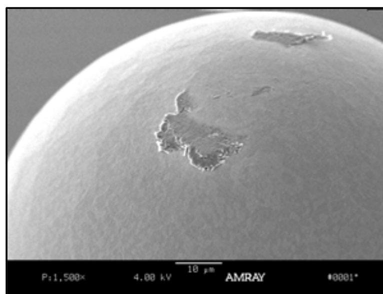
Cleaning organic residue from a Sn/Pb solder bump (EDS Analysis)

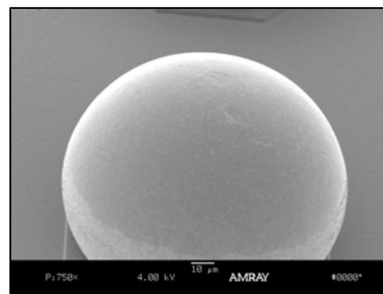


Process: BPS-125 → DI water, ambient temp, 30 sec → N_2 blow dry









Before Strip | BPS-125, 25°C, 2 min

IEEE SW Test Workshop

Semiconductor Wafer Test Workshop

June 8 to 11, 2008
San Diego, CA, USA

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