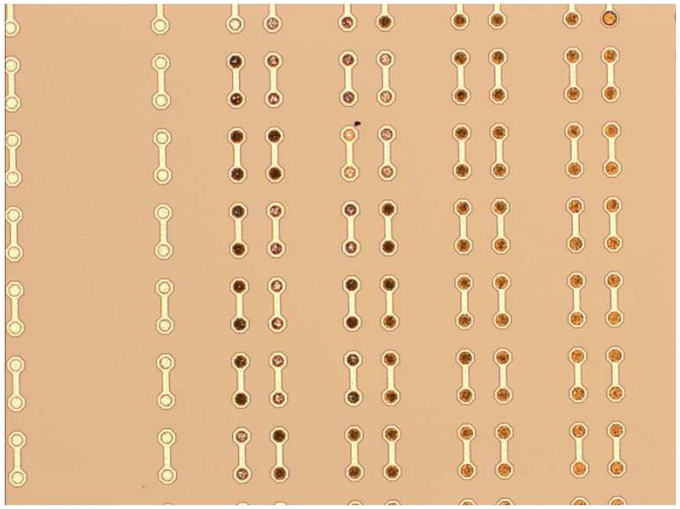
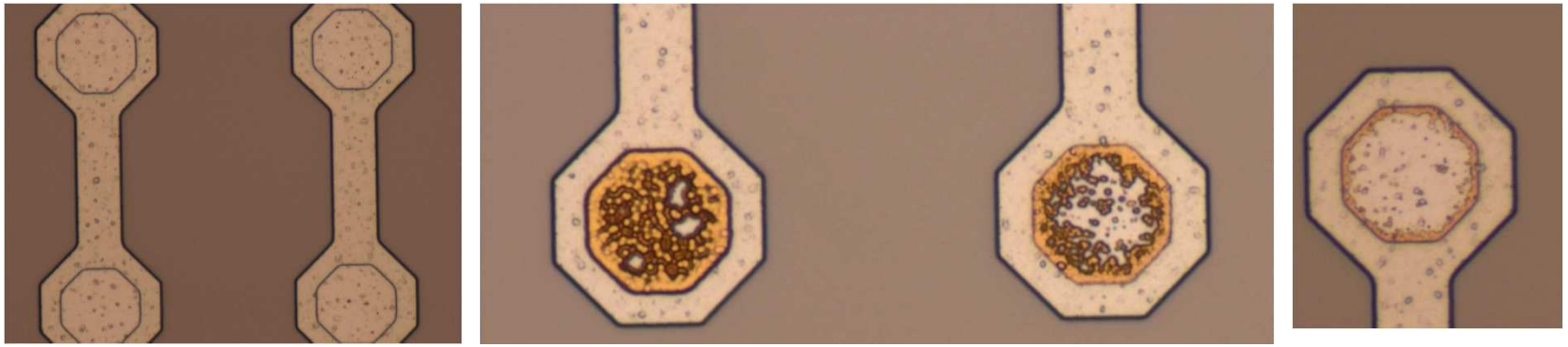
Pac Tech‘s electroless nickel gold (ENIG) UBM process failed on 5 of 7 CiS dummy wafers

OPTICAL MICROSCOPE PICTURES OF AFFECTED WAFERS

- First 7 AlSiCu wafers processed
- 2 wafers without failures
- 5 wafers show errors in UBM
- 12 unprocessed wafers (9 AlSiCu and 3 AlSi) go back to CiS



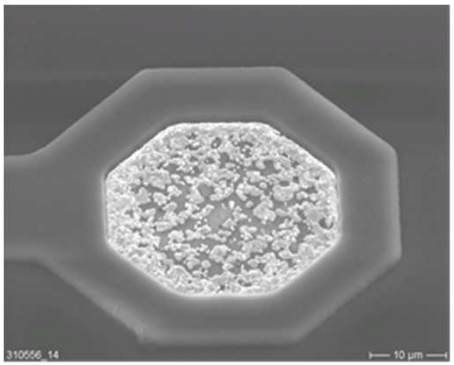
Overview after ENIG process



Zoomed views to pads either with missing or partial UMB after processing

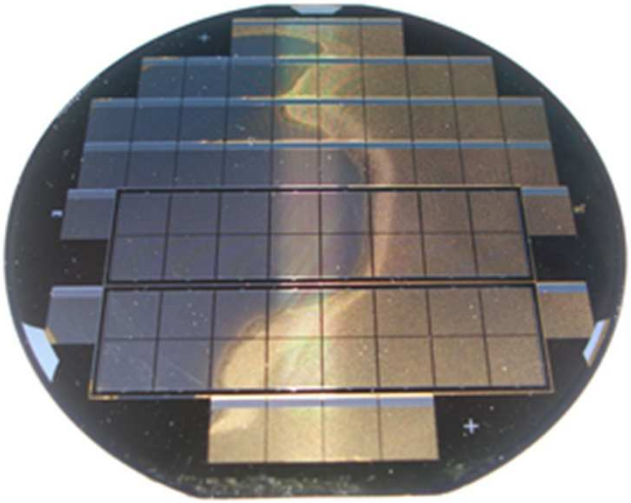
Pac Tech‘s electroless nickel gold (ENIG) UBM process failed on 5 of 7 CiS dummy wafers

EXEMPLARY SEM PICTURES OF AFFECTED WAFER #14

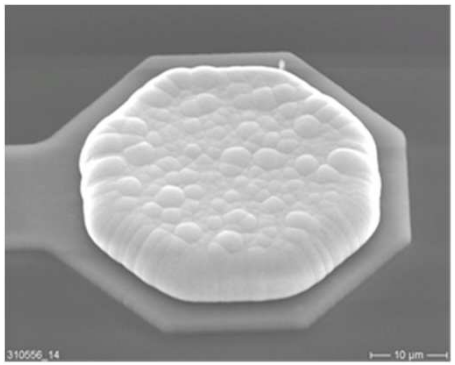


Pad with poor UBM

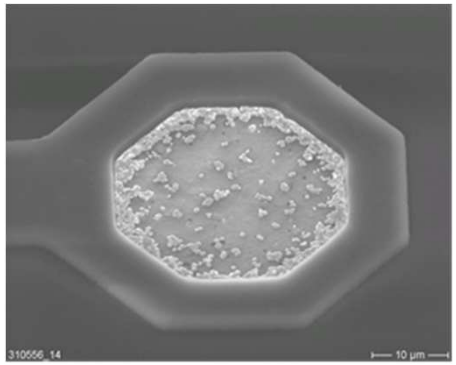
UBM quality



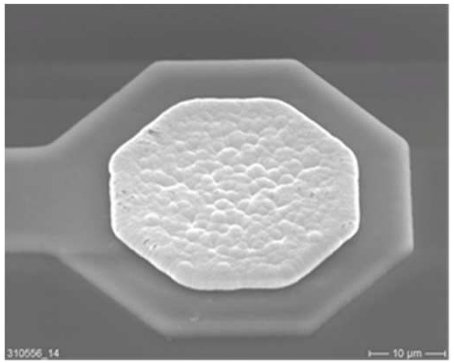
Wafer#14



Pad with UBM



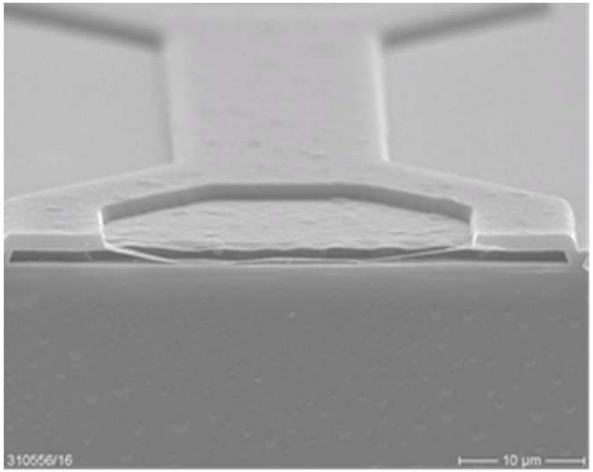
Few UBM islands only

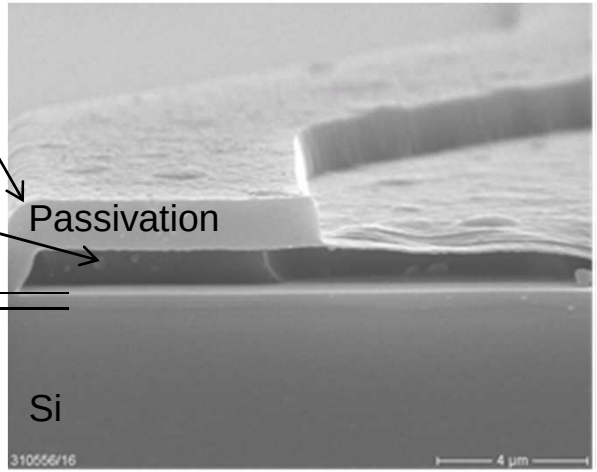


Pad with thin UBM

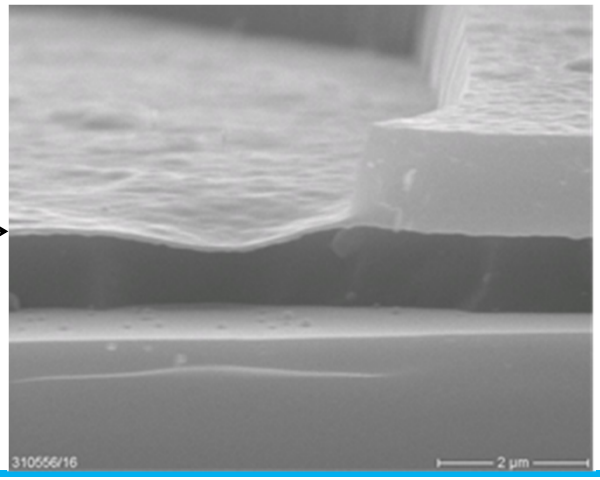
70 nm residual layer found in SEM cross sectional view

SEM PICTURES OF A UNWETTED PAD ON WAFER#16





Thin residual passivation layer 70 nm SiO2



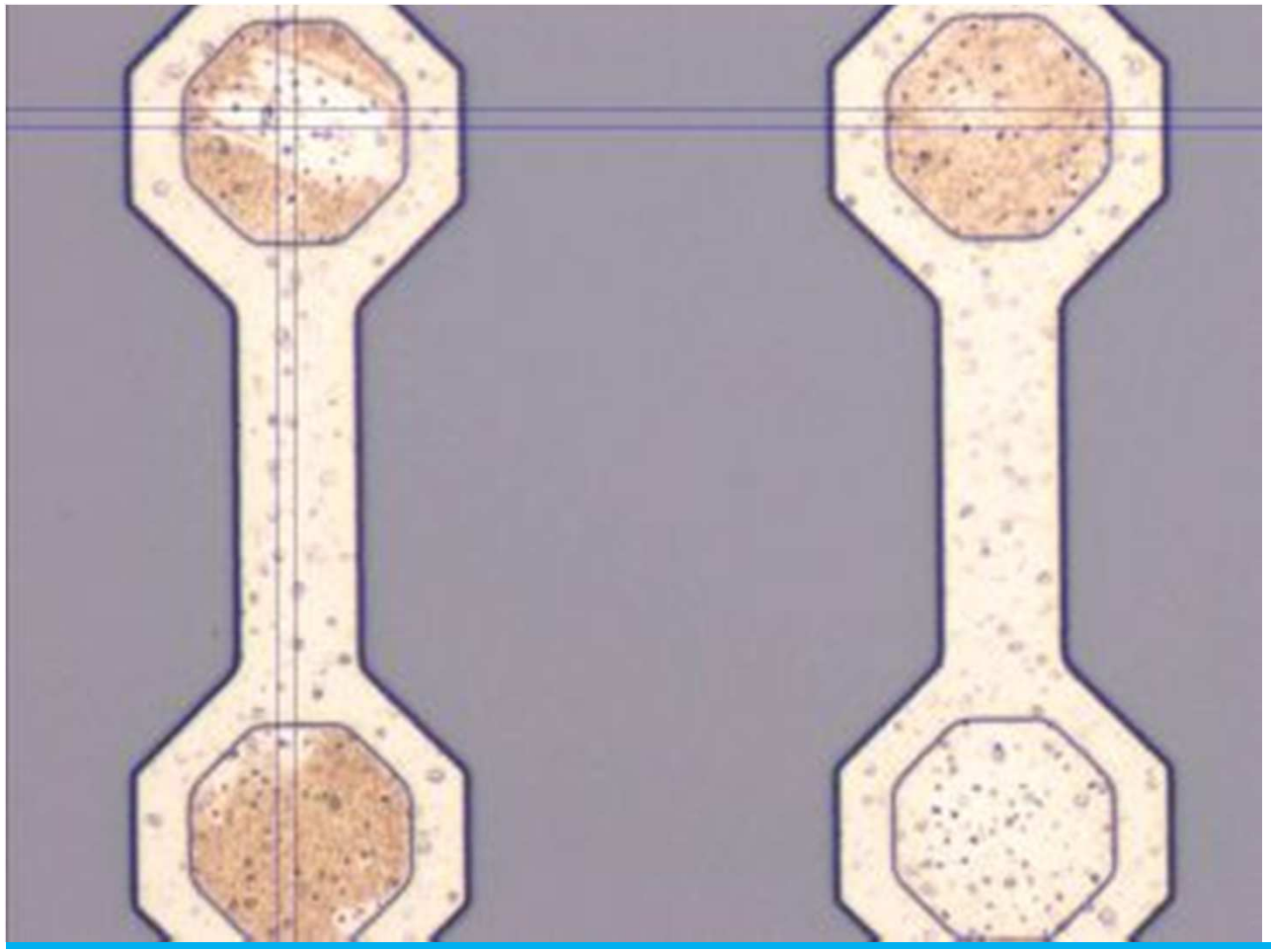
Plasma etch

- was stopped too early
- badly adjusted

Oxide deposition badly adjusted?

CiS second etch step resulted in discolored pads on both AlSiCu and AlSi wafers

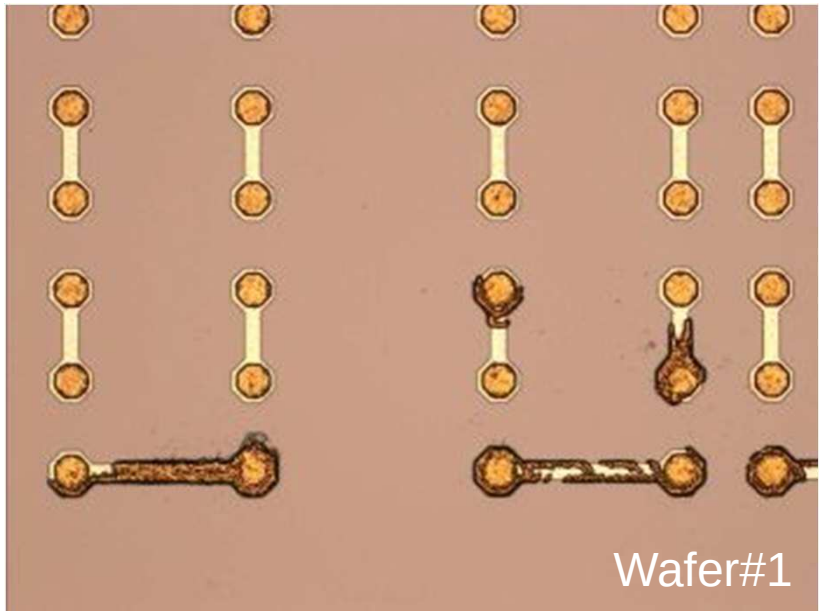
MICROGRAPHS OF PAC TECH INCOMING QUALITY CONTROL

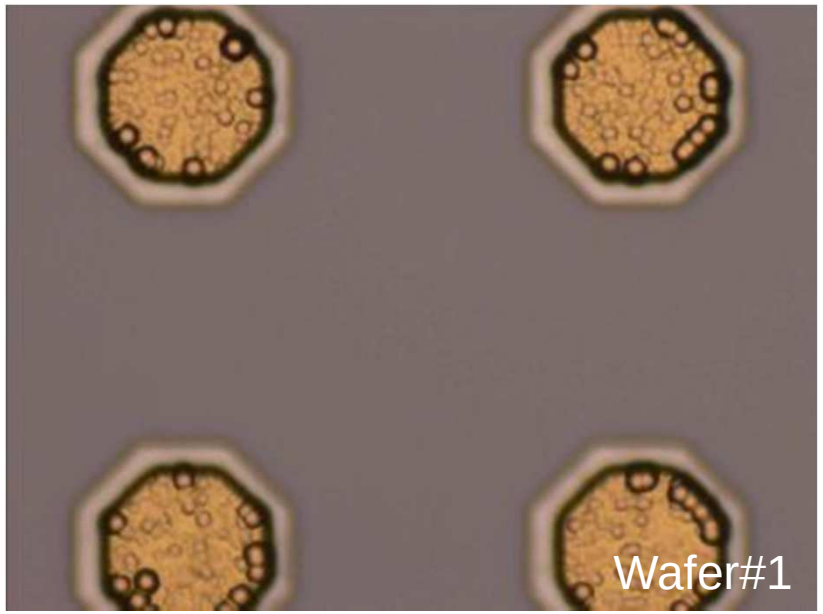


Affected pads:
50 to 70 %

UBM deposition tests failed in shorts and rough nickel surface

MICROGRAPHS OF PAC TECH UBM QUALITY CONTROL AFTER TEST PROCESS

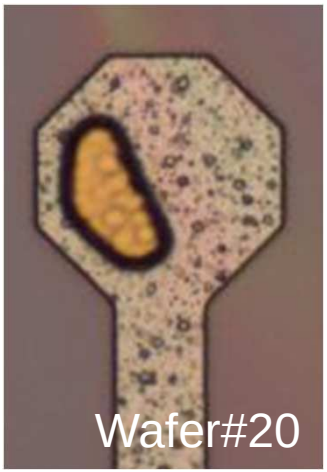




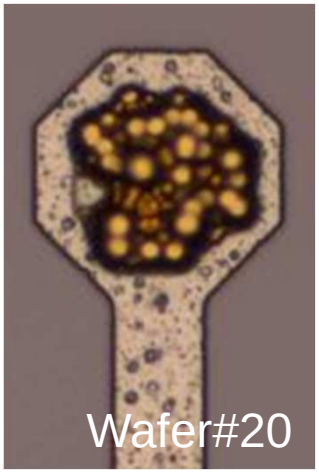
- UBM growth also on metal lines → shorts
- Irregular bump growth → rough surface

Pads are also still affected by incomplete openings in the passiviation layer

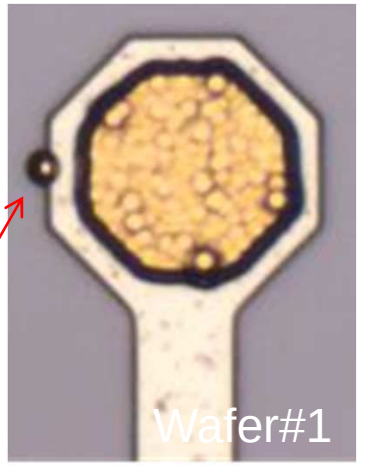
MICROGRAPHS OF PAC TECH UBM QUALITY CONTROL AFTER TEST PROCESS



Incomplete openings



Island like UBM growth



100 % of the pads are affected by failures