Elevate® Tin 5011

Fine Grain Pure Tin

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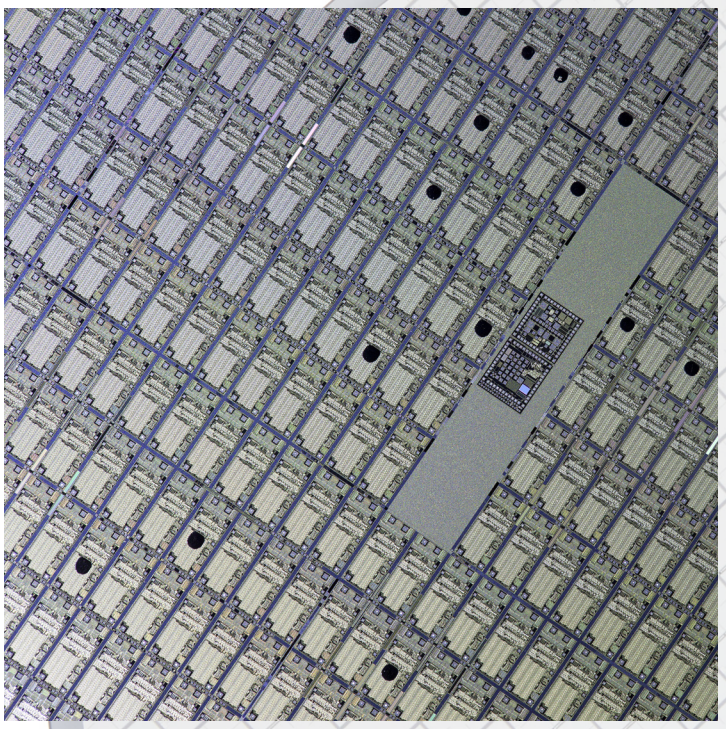
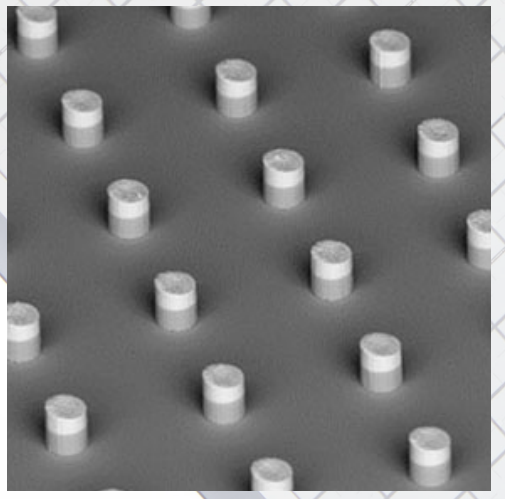
Versitle pure tin deposit with excellent solderability



Elevate® Tin 5011 is a small grain pure tin electroplating process that can be used in all semiconductor applications that require a solder cap such as bump plating or copper pillar plating. Traditional tin-silver solder has a high cost and is complex to maintain. Pure tin can provide similar attributes of tin-silver, but with a lower cost and the chemistry is much easier to manage.

Legacy pure tin products have had large grain deposits and were prone to whisker issues. Elevate Tin 5011 eliminates both of these issues which allows it to be used directly over copper. It can also be used in a Cu/Ni/Sn stack.

Elevate® Tin 5011 has been successfully used on feature diameters from 20 microns to 150 microns with thicknesses from 10 microns to 100 microns.



Features

- Small grain deposit though-out the life of the bath
- Whisker resistant
- Smooth, uniform, rounded grain structure
- Excellent solderability with no voiding after reflow
- Wide current density range
- Direct substitute for problematic tin-silver solder
- High efficiency

Benefits

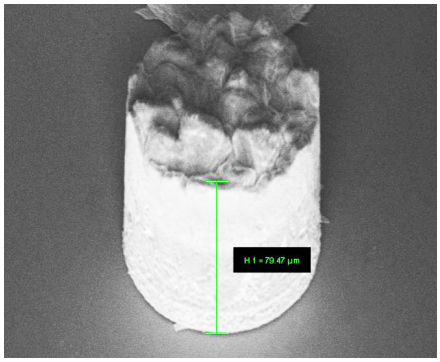
- Elimination of a difficult to control alloy (tin-silver) electroplating bath
- Reduces cost by providing a silver free solder chemistry
- Because of its small grain structure, it can be used on small diameter pillars
- Reduces makeup costs by maintaining good solderability and grain structure throughout the life of the bath

Elevate® Tin 5011 - High-speed Pure Tin

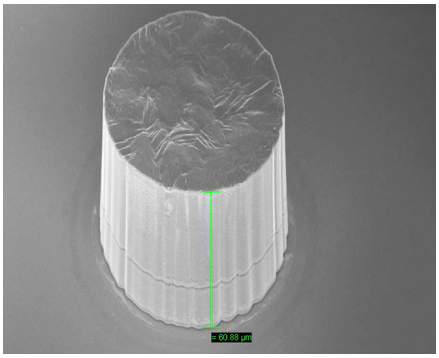
Grain Structure

Traditional pure tin baths that plate with large grains are not compatible with today's semiconductor features which continue to decrease in size. Smaller feature dimensions and pitches require tin plating deposits with fine grain structures that provide maximum reflow performance.

The image on the left (A) shows a traditional tin bath with large grain structure. The image on the right (B) shows the smaller grain structure of Elevate Tin 5011.



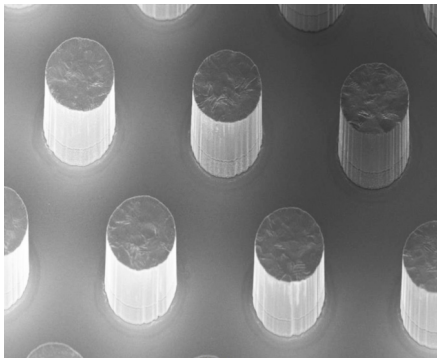
(A) Standard Tin Bath



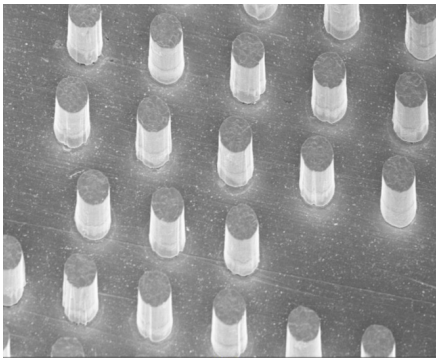
(B) Elevate® Tin 5011

Deposit Consistancy

Elevate® Tin 5011 can maintain optimum small grain structure and thickness across the length of a wafer, and can provide optimum results on various features sizes from 20 – 150 microns.



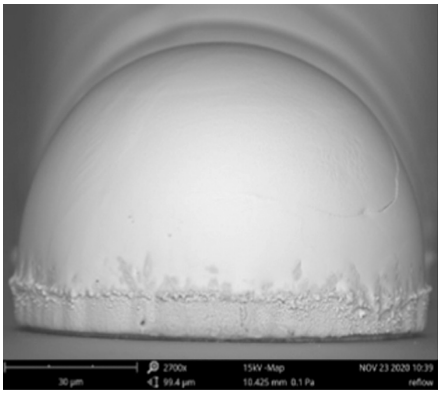
150 micron pitch - 90 micron diameter pillars with 50 microns of tin



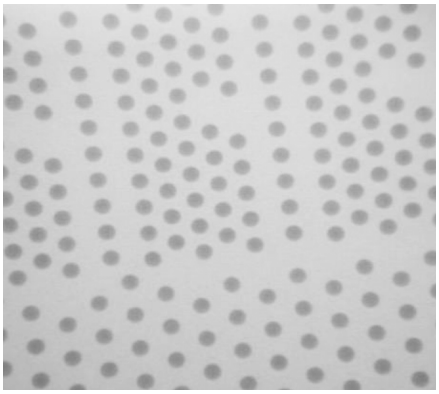
50 micron pitch - 25 micron diameter pillars with 10 microns of tin

Reflow

A compromised tin deposit that has a large grain structure and excessive amounts of codeposited organics will not properly reflow and can have several occluded voids.



A clearly defined and uniform reflow shown using Elevate® Tin 5011



X-ray inspection is used to determine if the reflowed deposit contains any voids.

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