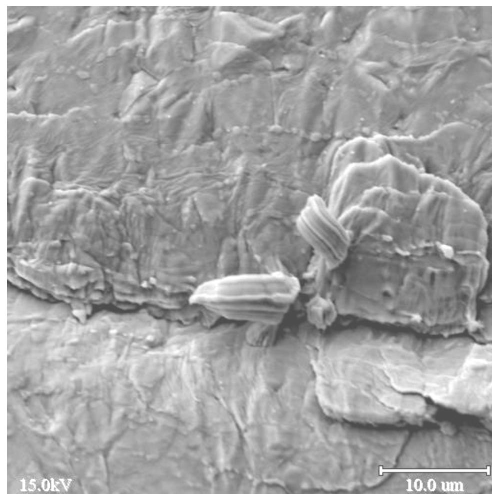
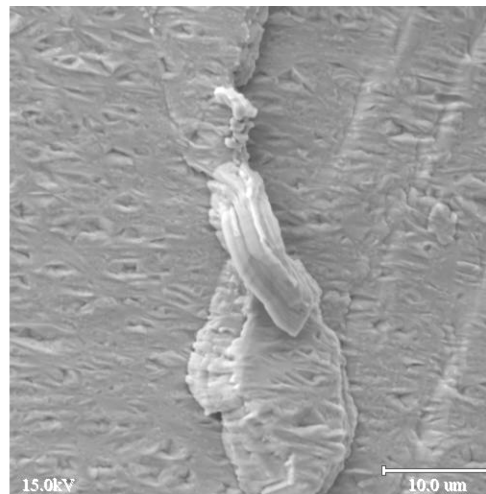
Board-Level Whisker Testing

(Sn/3.8Ag/0.7Cu Solder, 500 -55ºC/85ºC Temp Cycling)

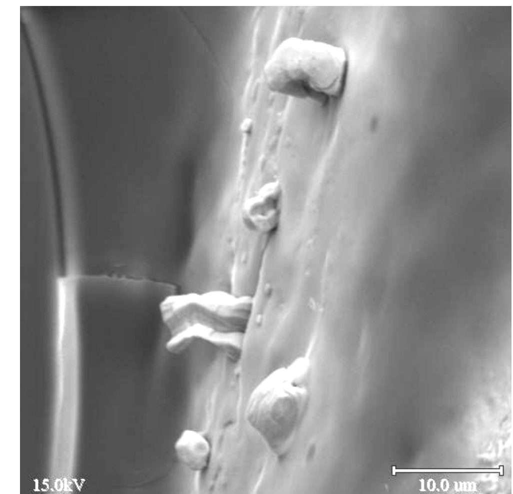
Package	Plating	Quantity	Max Length (µm)
64 LQFP	Sn	0-10	8
	Sn/2Bi	0-6	**15**
	Sn/15Pb	**75-177**	12



Whisker on top of shoulder- Sn finish



Whisker on top of foot - SnBi finish



Whisker on solder - SnPb finish

- **Whiskers formed after surface mount, even on the solder**
- **Solder may also be prone to whisker growth**

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Summary of Findings

- Sn/10-15Pb generally performed better than Sn and Sn/2-3Bi, which performed better than Sn/0.7Cu.
- Ni underplate did not retard whisker growth.
- External stress did not exacerbate whisker growth.
- Whiskers formed with 60ºC/95%RH storage and -55ºC/85ºC temperature cycling.
- Whisker appears to form from surface grains, may be related to intermetallics formed between grain boundaries.
- Whiskers formed even after surface mount.
- Solder may also be prone to whisker growth.

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Future Work

- Continue evaluation of various supplier chemistries.
- Complete correlation studies, temp cycle to ambient .
- Perform additional FIB analysis with other finishes.
- Perform reflow study with whiskered terminals.
- Initiate whisker study with Pb-free solders.
- Continue to participate in NEMI studies and discussions to define a standard accelerated whisker test method along with failure criteria and correlation to ambient.

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