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LEADFREE WHISKER GROWTH MONITORING

8L SOIC

Package Type

XXX

Customer

XXX

Device Number

Date : September 25, 2006

Zeny Puedan

Prepared by: Zeny Puedan
FAREL Eng'r.

Approved by: Rod Sanico
QC/QA Director

Fely Sumaoang

Noted by: Fely Sumaoang
QA Eng'r.

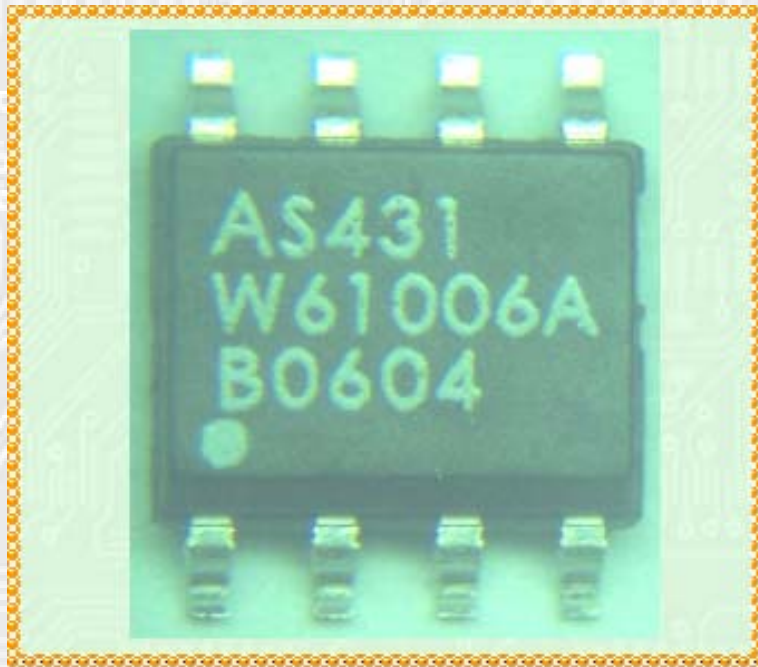


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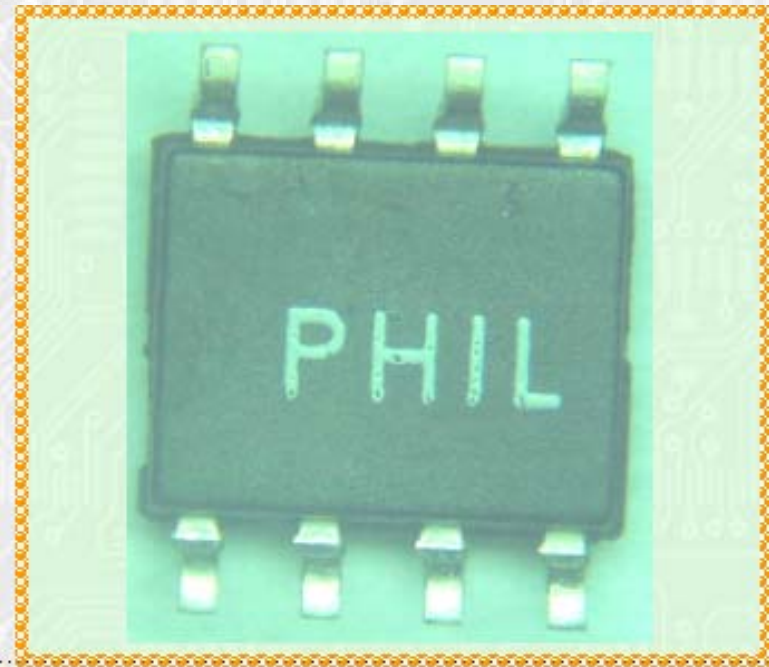
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LEADFREE – WHISKER GROWTH Sample Photo Documentation



Top Package



Bottom Package



LEADFREE – WHISKER GROWTH Sample Information

DEVICE INFORMATION		LEADFRAME / LEADFINISH INFORMATION	
Customer	: XXX	Plating Composition	: 99.9% - 100% matte Sn
Package Type	: 8L SOIC	Bath Chemistry	: Methane Sulfonic acid
Device #	: XXX	Grain Size	: 3 - 8 um
Lot #	: W61006A	Plating Equipment	: Jettech (hi-speed)
Mold Compound	: Sumitomo G600	Mitigation Practice	: Annealing 1 hour
Date Code	: 0604		: @ 150°C
Leadframe Type	: 8L SOIC MATRIX		



LEADFREE – WHISKER GROWTH Monitoring Plan

<u>TEST</u>	<u>CONDITIONS</u>	<u>DURATION/ READPOINTS</u>	<u>Date of SEM Inspection</u>	<u>SAMPLE SIZE</u>
Temperature Cycling	<u>MinTemperature</u> -65 to -55 (+0/-10)°C <u>MaxTemperature</u> +150 (+10/-0)°C air to air; 10mins soak; 2 cycle/hour	500x 1000x	May 06, 2006 May 27, 2006	6 units
High Temp / Humidity Storage	85±5°C / 85 (+3/-2) % RH	1000hrs 3000hrs	June 07, 2006 Sept. 07, 2006	6 units
Ambient Temp / Humidity Storage	30±5°C / 60±3% RH	1000hrs 3000hrs	June 07, 2006 Sept. 07, 2006	6 units



LEADFREE – WHISKER GROWTH MONITORING CLASIFICACION

Whisker Density Range	Total number of whiskers measured in three field of view per termination or area
No whisker	0 whisker
Low	< 10 whiskers
Medium	10 - 45 whiskers
High	> 45 whiskers



LEADFREE – WHISKER GROWTH MONITORING RESULTS

Temperature Cycle (-65°C / 150°C)

Number of samples inspected : 6 units
Number of Leads inspected per sample : 3 leads
Total number of Leads inspected : 18 leads
Number of Leads with whiskers : 0 leads

Components Number	Initial Pretest Whisker Inspection		500 Cycle Readpoints		1000 Cycle Readpoints	
	Whisker Density Range	Total Number of Whiskers per Component	Whisker Density Range	Total Number of Whiskers per Component	Whisker Density Range	Total Number of Whiskers per Component
1	No Whisker	0	No Whisker	0	No Whisker	0
2	No Whisker	0	No Whisker	0	No Whisker	0
3	No Whisker	0	No Whisker	0	No Whisker	0
4	No Whisker	0	No Whisker	0	No Whisker	0
5	No Whisker	0	No Whisker	0	No Whisker	0
6	No Whisker	0	No Whisker	0	No Whisker	0



LEADFREE – WHISKER GROWTH MONITORING RESULTS

High Temp/Humidity Storage (85°C / 85% RH)

Number of samples inspected : 6 units
 Number of Leads inspected per sample : 3 leads
 Total number of Leads inspected : 18 leads
 Number of Leads with whiskers : 0 leads

Components Number	Initial Pretest Whisker Inspection		1000 Hours Readpoints		3000 Hours Readpoints	
	Whisker Density Range	Total Number of Whiskers per Component	Whisker Density Range	Total Number of Whiskers per Component	Whisker Density Range	Total Number of Whiskers per Component
1	No Whisker	0	No Whisker	0	No Whisker	0
2	No Whisker	0	No Whisker	0	No Whisker	0
3	No Whisker	0	No Whisker	0	No Whisker	0
4	No Whisker	0	No Whisker	0	No Whisker	0
5	No Whisker	0	No Whisker	0	No Whisker	0
6	No Whisker	0	No Whisker	0	No Whisker	0



LEADFREE – WHISKER GROWTH MONITORING RESULTS

Ambient Temp/Humidity Storage (30°C / 60% RH)

Number of samples inspected : 6 units
 Number of Leads inspected per sample : 3 leads
 Total number of Leads inspected : 18 leads
 Number of Leads with whiskers : 0 leads

Components Number	Initial Pretest Whisker Inspection		1000 Hours Readpoints		3000 Hours Readpoints	
	Whisker Density Range	Total Number of Whiskers per Component	Whisker Density Range	Total Number of Whiskers per Component	Whisker Density Range	Total Number of Whiskers per Component
1	No Whisker	0	No Whisker	0	No Whisker	0
2	No Whisker	0	No Whisker	0	No Whisker	0
3	No Whisker	0	No Whisker	0	No Whisker	0
4	No Whisker	0	No Whisker	0	No Whisker	0
5	No Whisker	0	No Whisker	0	No Whisker	0
6	No Whisker	0	No Whisker	0	No Whisker	0



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LEADFREE – WHISKER GROWTH **MONITORING RESULTS SUMMARY**

The 8L SOIC packages under device # XXX and lot # W61006A was concluded with NO Tin whisker growth after subjected to 1000x Temp Cycle, 3000hrs High Temp/Humidity Storage and 3000hrs Ambient Temp/Humidity Storage. Samples had also passed electrical testing after each readpoints.

Parts were assembled at Cirtek Electronics using Sumitomo G600 mold compound and leadfinish with 100% matte Tin.



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SEM

Inspection

Photos



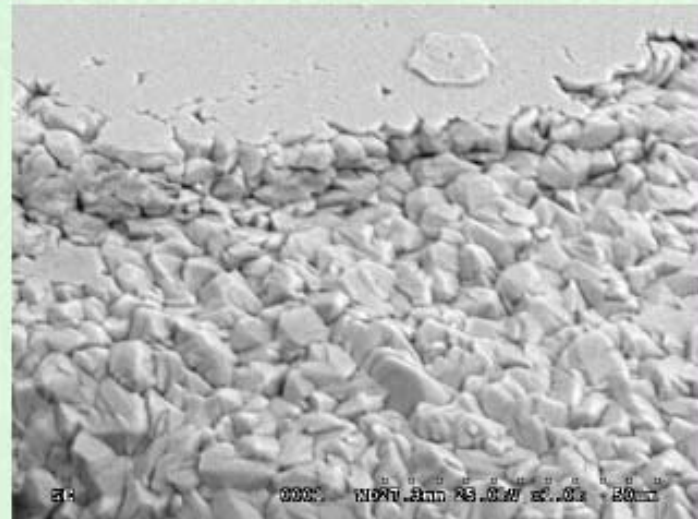
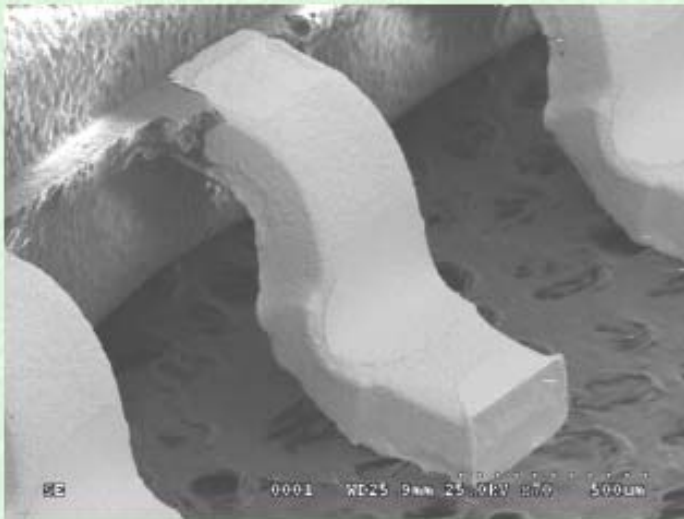
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PRIOR TO TEMP CYCLE

Date: April 23, 2006



Note: Sample photo of prior to Temp Cycle Tin Whisker growth visual inspection using SEM @ x100 & x1.0k magnification.



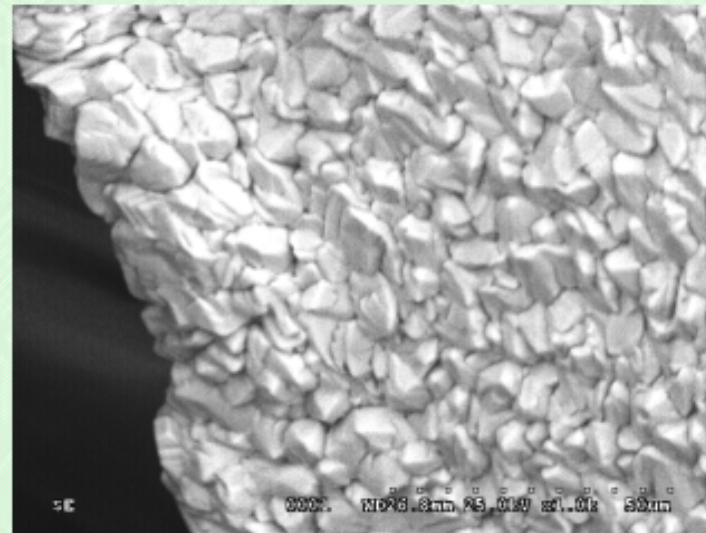
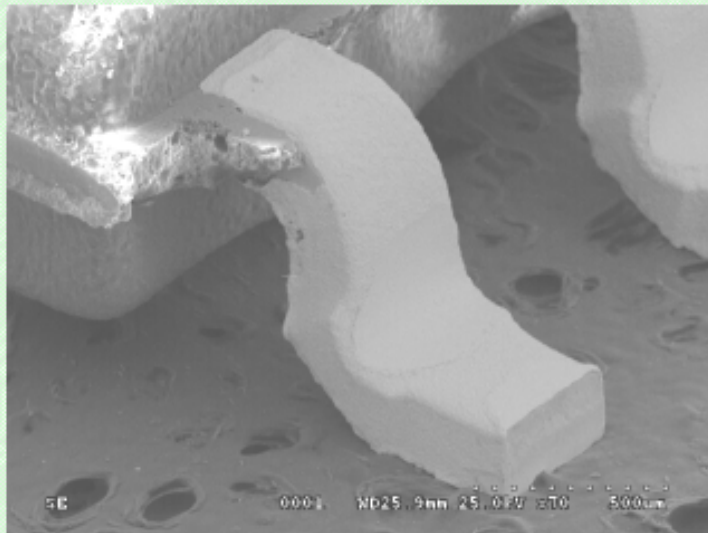
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PRIOR TO HIGH TEMP/HUMIDITY STORAGE

Date: April 23, 2006



Note: Sample photo of prior to High Temp Humidity Tin Whisker growth visual inspection using SEM @x100 & x1.0k magnification.



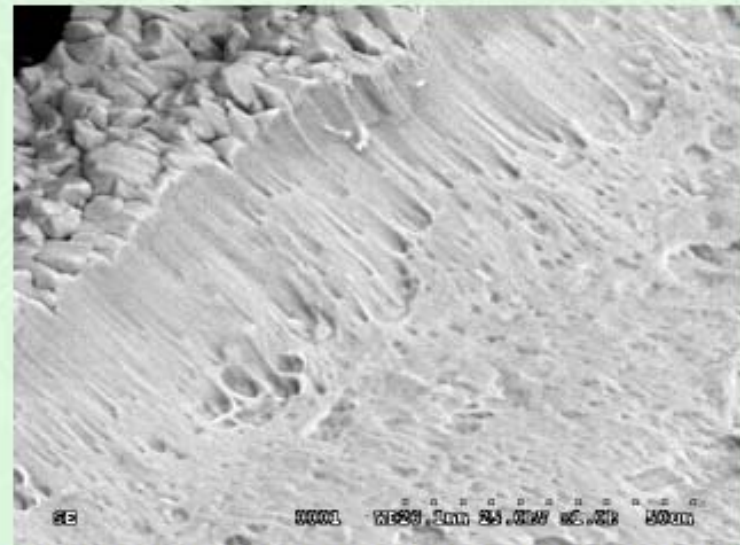
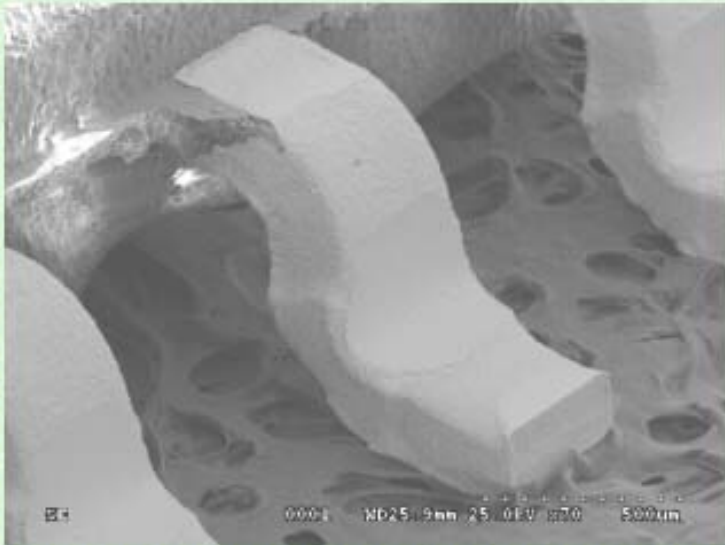
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PRIOR TO AMBIENT TEMP/HUMIDITY STORAGE

Date: April 23, 2006



Note: Sample photo of prior to Ambient Temp Humidity Tin Whisker growth visual inspection using SEM @ x100 & x1.0k magnification.



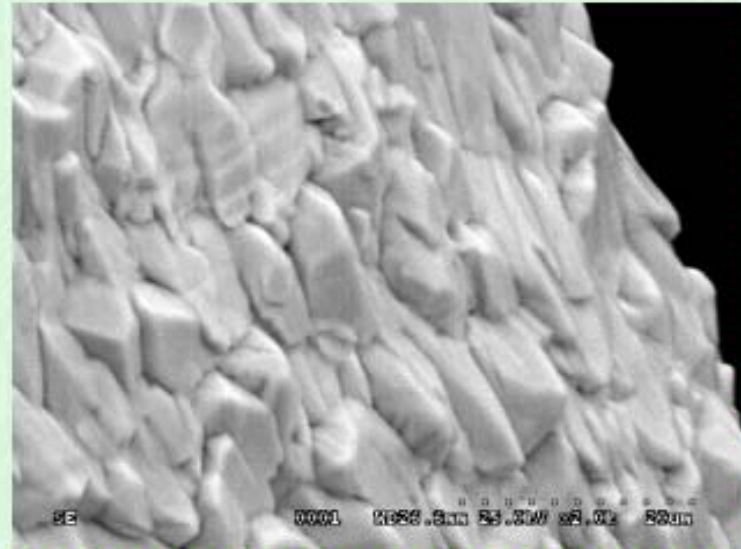
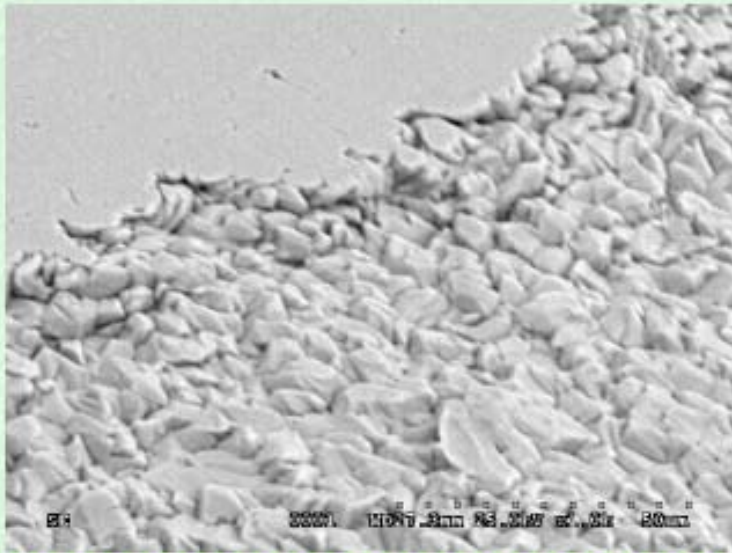
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AFTER 500x TEMP CYCLE

Date: May 06, 2006



Note: Sample photo after subjected to 500hrs Temp Cycle at $-65^{\circ}\text{C}/150^{\circ}\text{C}$. No tin whisker growth were observed after SEM inspection @ x1.0k magnification.



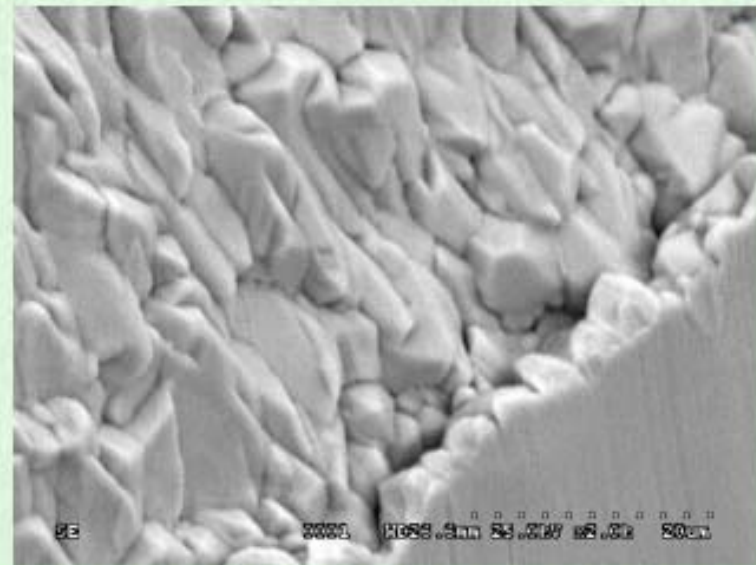
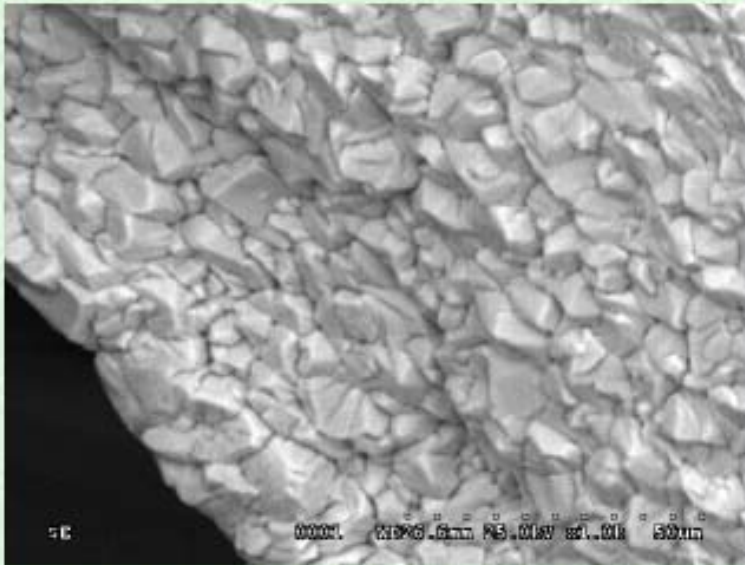
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AFTER 1000HRS HIGH TEMP/HUMIDITY STORAGE

Date: June 07, 2006



Note: Sample photo after exposure to 1000hrs High Temp Humidity at 85°C/85% RH. No tin whisker growth were observed after SEM inspection @ x1.0k magnification.



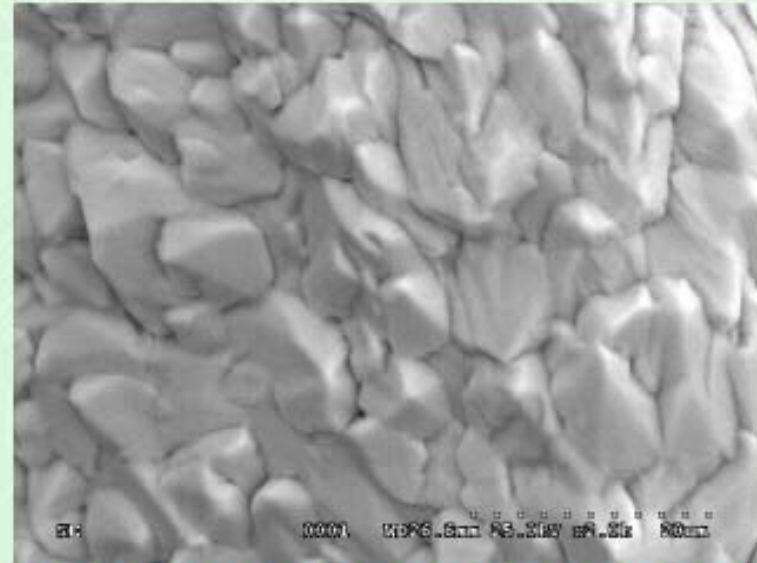
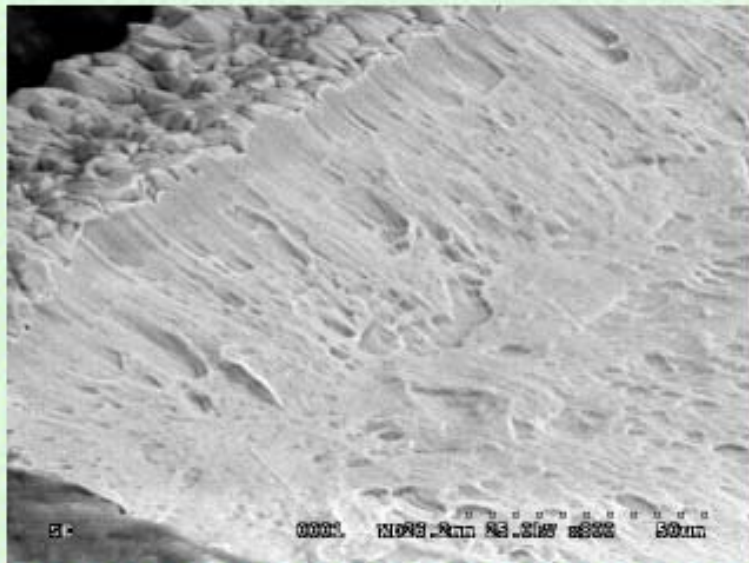
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AFTER 1000HRS AMBIENT TEMP/HUMIDITY STORAGE

Date: June 07, 2006



Note: Sample photo after exposure to 1000hrs Ambient Temp Humidity at 30°C/60%RH. No tin whisker growth were observed after SEM inspection @ x1.0k magnification.



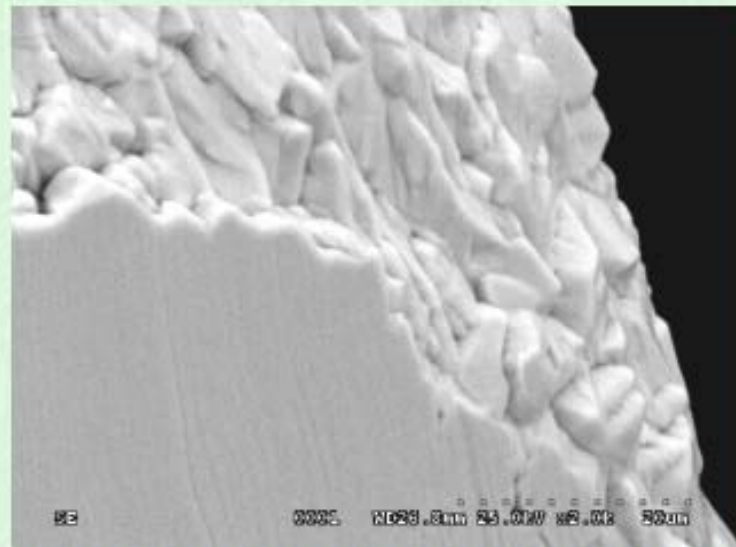
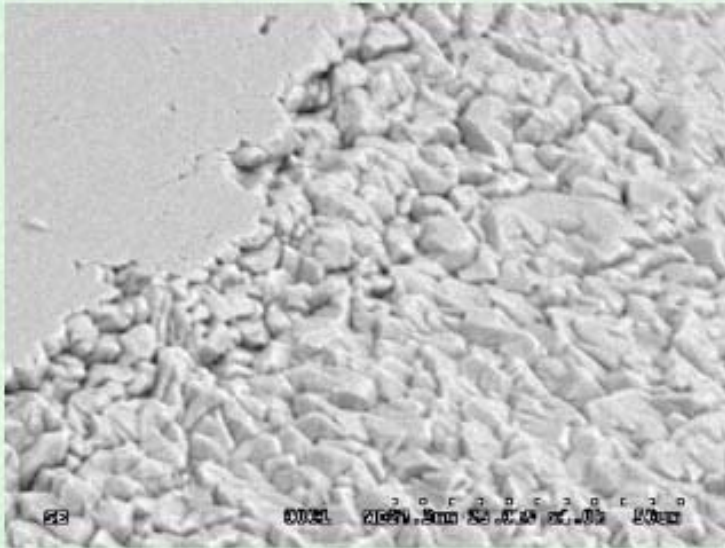
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AFTER 1000x TEMP CYCLE

Date: May 27, 2006



Note: Sample photo after subjected to 1000x Temp Cycle at $-65^{\circ}/150^{\circ}\text{C}$. No tin whisker growth were observed after SEM inspection @ x1.0k & x2.0k magnification.



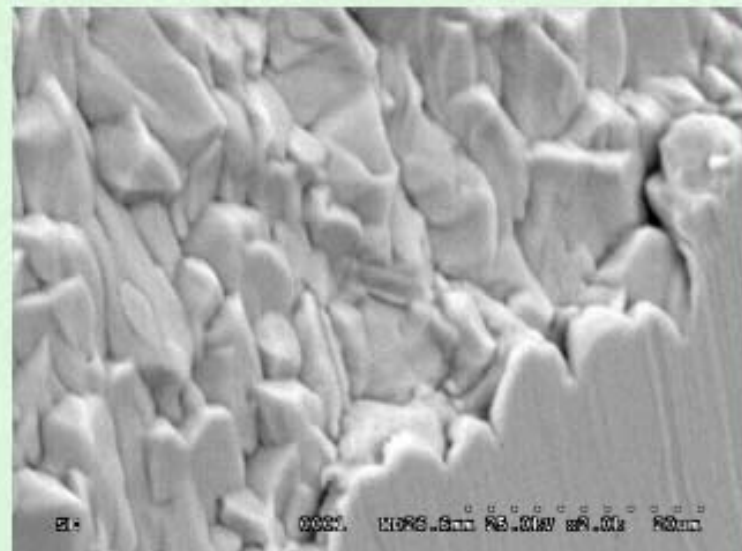
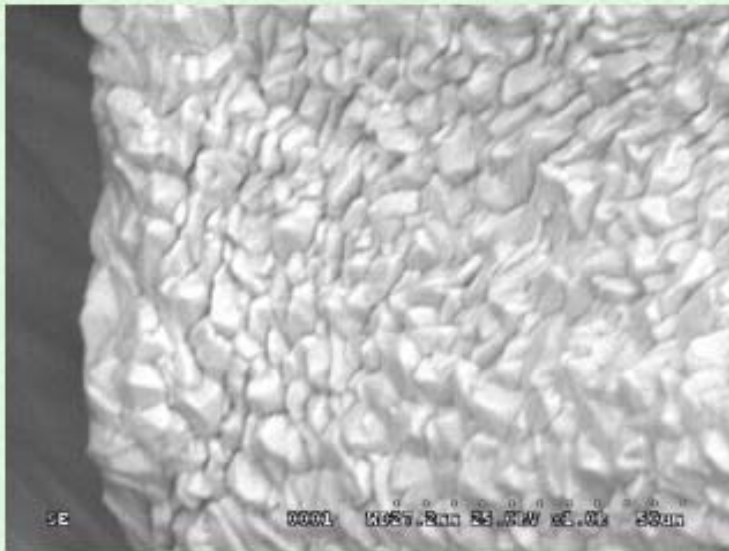
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AFTER 3000HRS HIGH TEMP/HUMIDITY STORAGE

Date: September 07, 2006



Note: Sample photo after exposure to 3000hrs High Temp Humidity Test at 85°C/85% RH. No tin whisker growth were observed after SEM inspection @ x1.0k & x2.0k magnification.



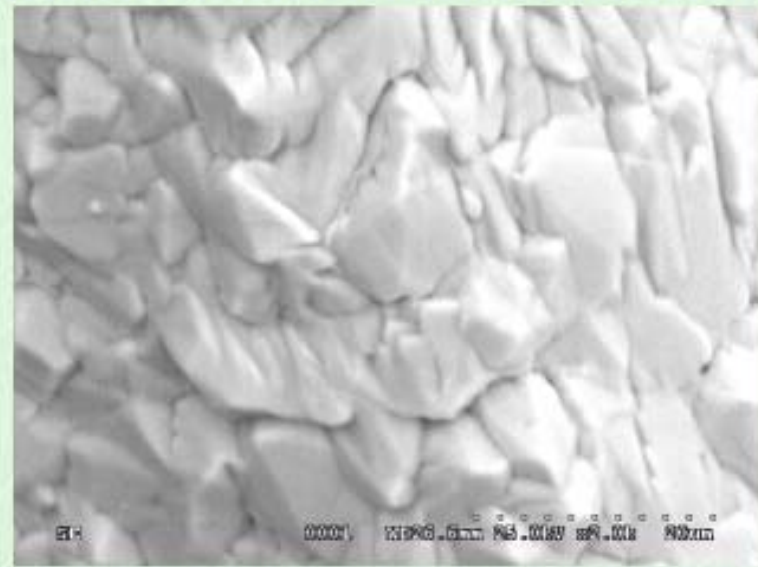
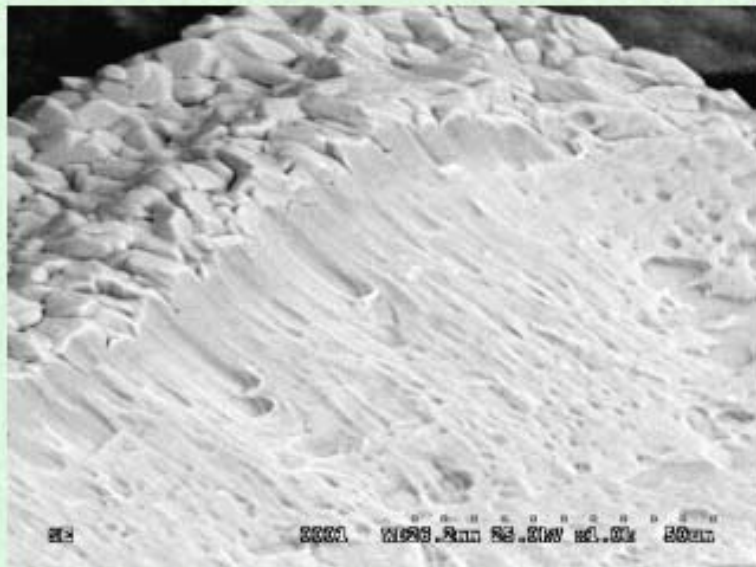
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AFTER 3000HRS AMBIENT TEMP/HUMIDITY STORAGE

Date: September 07, 2006



Note: Sample photo after exposure to 3000hrs Ambient Temp Humidity Test at 30°C/60% RH. No tin whisker growth were observed after SEM inspection @ x1.0k & x2.0k magnification.