

Sn Whiskers for Wednesday Whiskers Call

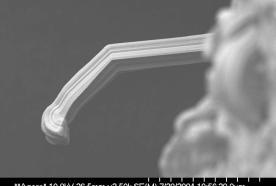
1.27.10

John Osenbach

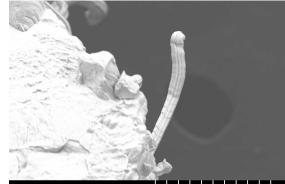


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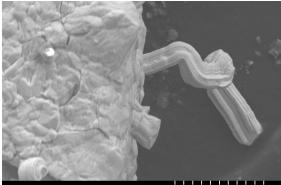
Examples of Different types of Sn whiskers



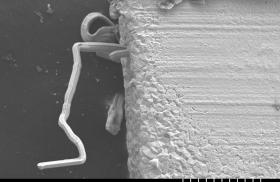
**Agere* 10.0kV 26.5mm x2.50k SE(M) 7/23/2004 10:56 20.0um



**Agere* 10.0kV 25.8mm ×1.30k SE(M) 7/23/2004 11:15 40.0um



**Agere* 10.0kV 27.3mm x2.00k SE(L) 8/4/2004 16:15 20.0um



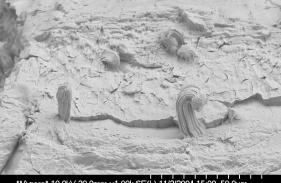
**Agere* 10.0kV 18.8mm ×700 SE(M) 10/22/2004 16:12 50.0um



**Agere* 10.0kV 25.8mm x3.00k SE(L) 6/15/2006 13:47 10.0um

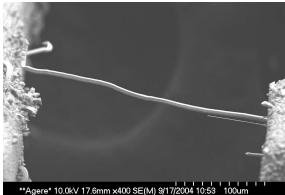


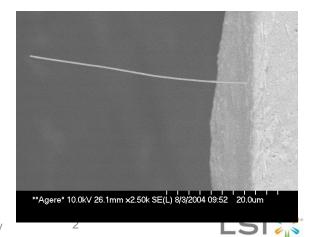
**Agere* 10.0kV 20.0mm ×1.10k SE(M) 9/17/2004 09:38 50.0um



**Agere* 10.0kV 20.0mm x1.00k SE(L) 11/2/2004 15:39 50.0um

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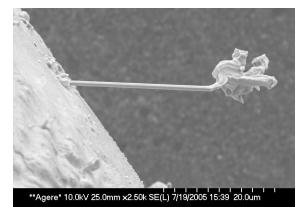


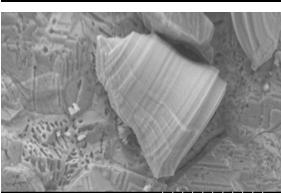
Examples of Different types of Sn whiskers



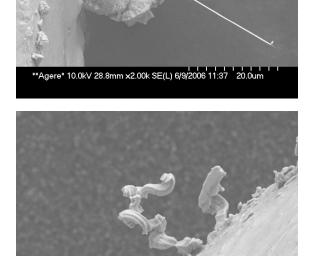
**Agere* 10.0kV 28.5mm ×1.30k SE(L) 6/9/2006 10:22 40.0um







**Agere* 10.0kV 27.1mm ×4.50k SE(L) 6/15/2006 10:14 10.0um

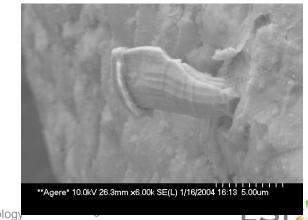


**Agere* 10.0kV 25.0mm x3.00k SE(L) 7/19/2005 16:09 10.0um



**Agere* 10.0kV 25.3mm x4.01k SE(L) 7/19/2005 16:39 10.0um

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Conclusions

- Whiskers take on a variety of shapes including whiskers growing from whiskers
 - \rightarrow difficult to reconcile whisker Sn growth as extrusion processes
- The many whiskers have both radial marks and kinks
 - Indicate a step wise process
 - ➤ excess Sn-local stress → local breaks in pinning surface oxide provide vacancies that allow excess Sn to move → excess Sn diffuses to nucleation site where whisker begins to grow → surface is re-oxidized → process continues



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