Tin Whiskers with Special Morphology

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Rapid tin whisker growth on the surface of ***Sn-3.8Ag-0.7Cu-1.0Ce/Er/Y* solder joints*** has been investigated. The results show that, besides the regular pencil-shaped whiskers, spiral tin whisker; plate-like whisker; bent whiskers with many continuous kinks; tin whisker with a non-constant cross section; branch-type tin whisker and joining-type tin whisker were also found in our study. These tin whiskers are shown as follows:

** Sn = Tin Ag = Silver Cu = Copper*

Ce = Cerium Er = Erbium Y = Yttrium

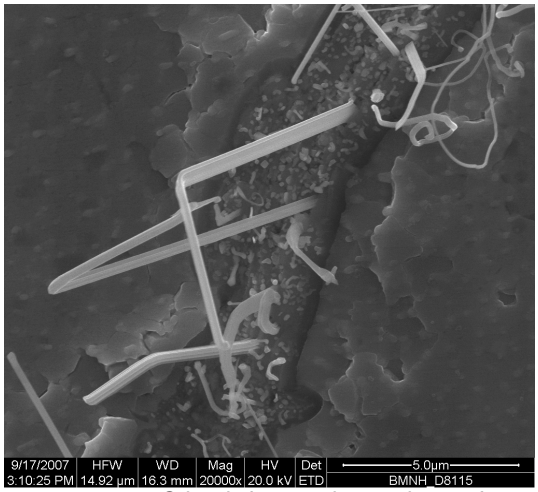
1. Spiral tin whisker and distorted tin whisker

Storage at room temperature in air for 720hr, on the surface of $CeSn_3$ phase

Storage at room temperature in air for 820hr, on the surface of $CeSn_3$ phase

2. Irregular plate-like tin whisker and regular ribbon-like tin whisker

Storage at 125℃ in air for 20min, then at room temperature for 260hr, on the surface of $ErSn_3$ phase



Storage at 150℃ in air for 20min, on the surface of $ErSn_3$ phase

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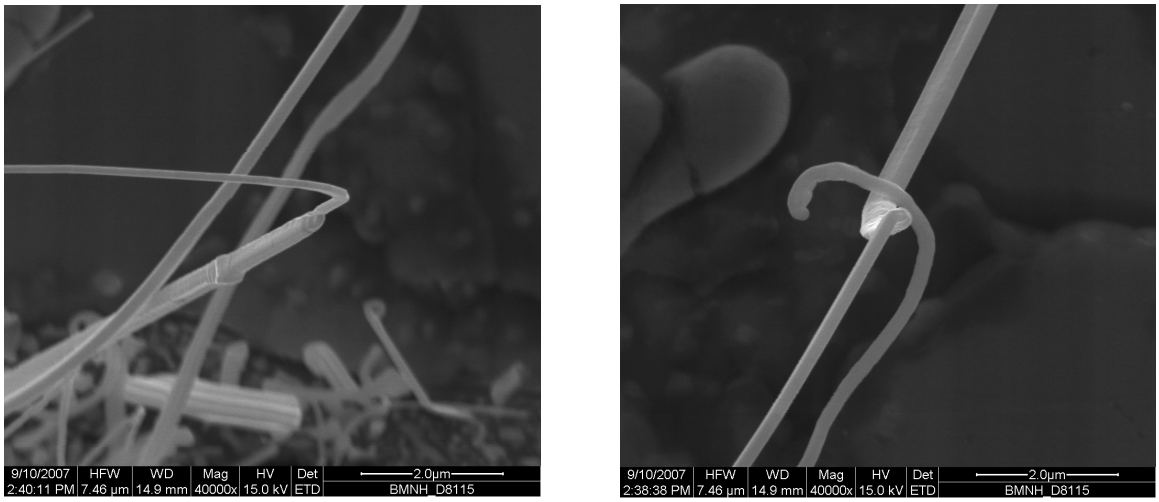
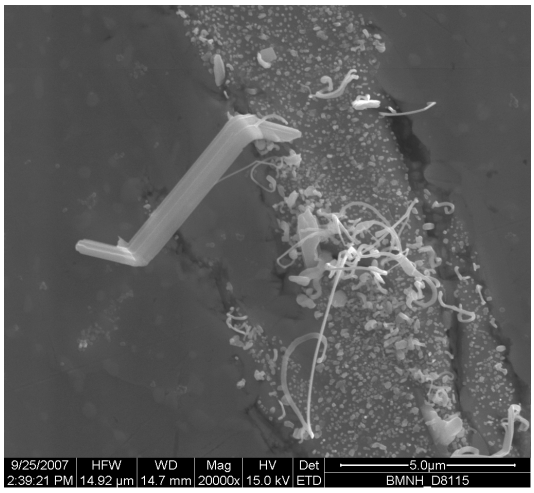
3. Tin whiskers with non-constant cross section



Storage at 150℃ in air for 20min, on the surface of $ErSn_3$ phase



Storage at room temperature in air for 312hr, on the surface of $ErSn_3$ phase

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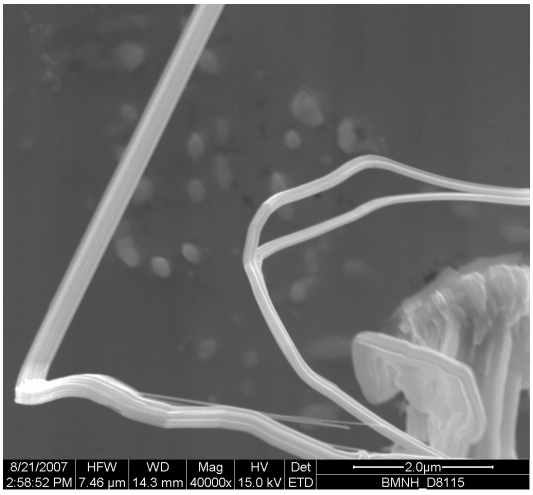
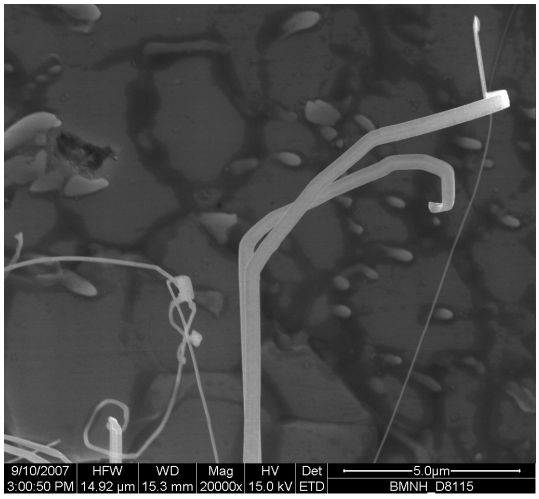
4. Branch-type tin whiskers

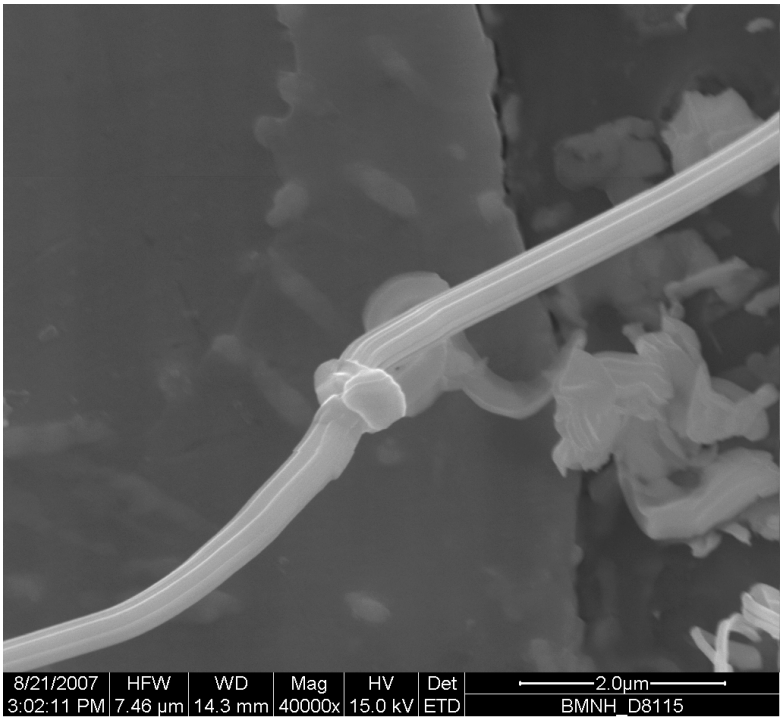


Storage at room temperature in air for 312hr, on the surface of $CeSn_3$ phase



Storage at 150℃ in air for 20min, on the surface of $ErSn_3$ phase

5. Tin whisker with a joint



Storage at room temperature in air for 312hr, on the surface of $CeSn_3$ phase