

## **Auger Electron Spectroscopic (AES) Measurements on High Aspect Ratio Sn Whiskers**

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### **ABSTRACT**

With the implementation of RoHS directives regarding Pb free electronics, pure Sn films and board finishes offer potentially serious reliability issues due to Sn whisker formation. A central aspect of Sn whiskers is that of composition. There have been few direct materials studies of Sn whiskers and, in particular, the surfaces of Sn whiskers. In this study, high resolution Auger electron spectroscopy (AES) has been used to determine the surface and bulk composition of high aspect ratio Sn whiskers. The whiskers were grown from intrinsically stressed thin films ( $\sim 1500 \text{ \AA}$ ) of Sn on brass, deposited using cylindrical magnetron sputtering techniques. Results show that the whiskers are 100% Sn at the whisker base, shaft, tip, and up to a depth of  $1000 \text{ \AA}$  into the whisker bulk. No evidence of the brass substrate or surface contaminants is observed in the whiskers. A remarkable aspect of the growth is that high aspect ratio whiskers  $\sim 100\text{-}500 \text{ \mu m}$  in length containing no brass are grown from a  $\sim 0.15 \text{ \mu m}$  thin film of Sn on brass.