

Whisker growth under controlled driving force.

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Abstract:

Whisker growth from electrodeposited Sn layers has been a subject of numerous studies. Although, it is generally believed that a compressive stress in the Sn layer drives the whisker growth, not many studies conclusively relate whisker nucleation and growth to the driving force. This is partly due to multiple sources of compressive stress in Sn layer and a lack of control over stress coming from different sources. We have developed a new methodology to study the whisker nucleation and growth kinetics under controlled application of mechanical load. Whisker nucleation and growth kinetics were captured in real-time by SEM imaging while the pressure is maintained on the samples. We observed whiskers grow linearly with time and their growth can be interrupted by unloading the samples. We use FEA modeling to relate the driving force to the growth kinetics. The results show a reasonable match between experiments and modeling.

Keywords: Sn whisker, Nucleation and growth, mechanical load, FEA