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Sn晶须的形态机制

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摘 要：将稀土相$CeSn_3$与$ErSn_3$暴露于空气中，研究在时效处理过程中稀土相表面Sn晶须的形态机制。结果表明：时效过程中在稀土相表面出现的绝大多数Sn晶须均是具有恒定截面的规则Sn晶须；同时也发现少数特殊形态的不规则Sn晶须，如卷曲状的Sn晶须、变截面的Sn晶须、分枝及搭接的Sn晶须等；由于稀土相的氧化所产生的体积膨胀提供Sn晶须生长的驱动力，而稀土相的氧化极不均匀，因此，认为Sn晶须在生长过程中其根部受力状态的改变是导致特殊形态Sn晶须出现的根本原因。

关键字：无铅钎料；稀土；Sn晶须；形态

Mechanism of tin whisker morphology

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Abstract: The morphological mechanisms of tin whisker growth on the surface of oxidized $CeSn_3$ and $ErSn_3$ precipitates were investigated during the aging. The results indicate that most tin whiskers have constant cross section and regular shape. However, few irregular tin whiskers with special morphologies are also observed, including the spiral whiskers, whiskers with a non-constant cross section, branch-type whiskers and joining-type whiskers. Since the produced lattice expansion of the rare earth precipitates oxidization provides driving force for the tin whisker growth, and the oxidization is extremely uneven. Therefore, the changes of stress around the tin whisker root will primary cause that results in the growth of irregular tin whiskers.

Key words: lead-free solder; rare earth; tin whisker; morphology

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