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Sn-Sb包晶合金的快速凝固

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摘要: 设计了一种用于Sn-Sb等滑动轴承合金的无容器接触深过冷快速凝固装置。并以热流分析为基础, 利用传热模型和物理模型计算了Sn-16%Sb(质量分数)过包晶合金在本装置中的冷却速度。结果表明: 在粒子直径为4mm时, 粒子的冷却速度为 3.1×10^2 K/s; 当粒子直径为0.1mm时, 冷却速度达到了 10^5 K/s。Sn-Sb包晶合金组织显著细化, 初生相SnSb化合物高度弥散化。

关键字: Sn-Sb包晶合金; 无容器凝固装置; 快速凝固; 晶粒细化

Rapid solidification of Sn-Sb peritectic alloy

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Abstract: A new containerless rapid solidification device used to prepare Sn-Sb journal bearing alloys was developed. Based on the theory of heat flux, the cooling rate of Sn-16%Sb hyperperitectic alloy prepared by the device was calculated by means of modes of heat transfer and physics. The calculation results indicate that the cooling rate of a 4mm size droplet is 3.1×10^2 K/s and the cooling rate of a 0.1mm size droplet is 10^5 K/s. The experiment results show that the rapidly-solidified Sn-16%Sb hyperperitectic alloy exhibits notably refined grain and highly dispersed primary intermetallic SnSb phase, indicating that the device achieved grain refinement effects.

Key words: Sn-Sb peritectic alloy; containerless solidification device; rapid solidification; grain refinement

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