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含少量Ag的7055铝合金组织与性能

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摘要: 研究了含0.2%Ag(质量分数)的7055铝合金铸造和445°C/24 h+470°C/24 h二级均匀化后基体中的组织特征及120°C时效特性。EDS能谱分析结果表明: 加入0.2%Ag在铸造组织中形成了含Ag的AlZnMgCuAg型化合物; 445°C/24 h+470°C/24 h二级均匀化并不能完全消除晶界非平衡共晶相, 晶内的AlFeCuZn型化合物未溶解, 且在均匀化冷却过程中溶入Zn, Mg和Ag原子; 120°C时效时合金出现时效硬化响应快和强度稳定性高等特点。加入Ag元素促进GP区的形成及提高GP区溶解温度可以解释其时效硬化响应快和强度稳定性高的原因, 同时合金元素含量的提高也对时效硬化响应加快起作用。

关键字: Ag; 7055铝合金; 组织; 性能; EDS能谱分析

Structures and properties of 7055-0.2%Ag aluminum alloy

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Abstract: Microstructures and mechanical properties of 7055 Al alloy containing 0.2% Ag under-gone various heat treatments were investigated. The results of energy dispersive spectrum analysis show that AlZnMgCu compounds emerge in the as-cast structures due to addition of 0.2% Ag; the 445°C/24 h+470°C/24 h two-step homogenizing process partially removes constituent particles at grain boundaries, and Zn, Mg, Ag atoms incorporate into AlFeCuZn compounds and form AlFeCuZnMgAg compounds. Accelerating aging response and high stability of strength that were observed during aging at 120°C for various time are due to high level of alloying elements and the addition of Ag element.

Key words: Ag; 7055 Al alloy; structures; properties; energy dispersive spectrum analysis

