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Al-Ti-C-B中间合金对高铝锌基合金组织和性能的影响

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摘要:

研究了Al-6.53Ti-0.3C-0.46B中间合金 (Ti:C>4:1) 对高铝锌基合金的组织 and 性能的影响, 结果表明, 加入适量的中间合金可显著细化合金的显微组织, 初生富铝 α 相从粗大的树枝晶转变为细小均匀等轴晶, 等轴晶尺寸30~50 μm 。砂型铸造条件下, 合金的伸长率从1.7%提高到10.0%, 拉伸强度在410 MPa左右。金属型铸造条件下, 合金的伸长率从1.0%提高到16.0%, 拉伸强度约407 MPa。尽管组织显著细化, 但拉伸强度并没有显著增加。高铝锌基合金组织细化的机理主要通过加入Al-Ti-C-B中间合金增加了异质形核质点。

关键词: 锌基合金 锌铝合金 Al-Ti-C-B中间合金 变质处理 组织细化

Effects of Al-Ti-C-B master alloy on the microstructure and mechanical properties of high aluminum zinc based alloy

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Abstract:

This paper addressed the effects of Al 6.53Ti 0.3C 0.46B master alloy (Ti: [KG-*2]C>4: [KG-*2]1) on the microstructure and mechanical properties of high aluminum zinc based alloy. Experimental results show that the addition of the master alloy can significantly refine the microstructure of the high aluminum zinc based alloy. The shape of a primary α phase grain changes from coarse dendrite into fine and uniform equiaxed crystal. The average size of equiaxed crystal is 30~50 μm . The extension rate of the alloy increases from 1.7% to 10.0% and the tensile strength is about 410 MPa in the condition of sand casting (SC). The extension rate of the alloy increases from 1.0% to 16.0% and the tensile strength is about 407 MPa in the condition of permanent mold casting (PMC). Its tensile strength does not significantly increase though its microstructure is obviously refined. Its refinement mechanism is the increase of heterogeneous nucleus due to the addition of Al-Ti-C-B master alloy.

Keywords: zinc based alloy zinc aluminum alloy Al-Ti-C-B master alloy modification refinement

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