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论文

ZA27合金准固相区流变行为及其对上引连铸补缩质量的影响

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摘要： 通过研究ＺＡ２７合金准固相区的流变行为建立了合金在不同温区的流变模型．结果表明，在３８５－３９０℃和４００－４３０℃，合金的流变模型分别为六元件和五元件模型，并据此推导出合金的流变本构方程．六元件模型为：［Ｈ_１‖Ｓ_１］－［Ｈ_２‖Ｎ_１］－［Ｎ_２‖Ｓ］五元件模型为：Ｈ_１－［Ｈ_２‖Ｎ_１］‖Ｎ_１］－［Ｎ_２‖Ｓ］根据试验结果计算出各个温度下合金的流变参数，结合合金相图及ＤＴＡ曲线，确定合金凝固过程中的质量补缩与枝晶补缩停止温度分别为４２０℃和３９０℃，为ＺＡ２７合金的铸造工艺设计及凝固过程分析提供了重要依据．最后分析讨论了上引连铸ＺＡ２７合金的补缩条件，提出了满足铸坯补缩要求的上引连铸稳定工作条件．

关键词： ＺＡ２７合金 准固相区 流变 上引连铸 补缩

RHYOLOGIC BEHAVIOR OF ZA27 ALLOY IN QUASI-SOLID STATE AND ITS EFFECT ON THE FEEDING QUALITY DURING UPCC

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Abstract: The rhyologic behaviors of the alloy ZA27 in the range of 385-390℃ and 400 -430℃ can be described by six element and five element model respectively. Based on these models, the stress-strain equations were deduced, and the creep, reverse creep, loading, and unloading characteristics were discussed. Rhyologic parameters of the alloy at different temperatures were calculated from the experimental results. According to the phase diagram and DTA curves, the stagnant temperatures for the mass feeding and interdendritic feeding during the solidification process of the alloy were determined as 420℃ and 390℃ respectively. By analysing the feeding conditions of upward continuous casting (UPCC) ZA27 alloy, a steady working condition was proposed under which the internal quality of the strand can be assured during UPCC.

Keywords: ZA27 alloy quasi-solid state rhyology upward continuous casting(UPCC) feeding

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