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Al-Mg-Sc合金热塑性和热轧工艺

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摘要: 采用高温瞬时拉伸试验和电子显微镜研究Al-Mg-Sc合金在高温下的塑性变形特征。结果表明, 随试验温度升高, 合金高温瞬时拉伸强度下降, 而塑性增加, 350~400 °C实验温度下合金的变形抗力相对较低, 热塑性较好。大生产条件下的热加工工艺验证试验也表明, 350~470 °C实验温度范围内铸锭热加工温度越高, 轧制开裂的几率越大, Al-Mg-Sc合金适宜的热轧温度为350~420 °C。另外, 大生产条件下还应严格控制热加工道次和道次变形量, 开始轧制时道次压下量和轧制速度不宜过大, 轧制变形量超过25%后, 应逐渐加大道次压下量和提高轧制速度, 使变形深透到整个轧件厚度。

关键字: Al-Mg-Sc合金; 热塑性; 热轧工艺; 显微组织

Thermo-plasticity and heat rolling processing of Al-Mg-Sc alloy

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Abstract: The flow behavior of Al-Mg-Sc alloy during high temperature plastic deformation was studied by high temperature tensile test and electronic microstructure analysis. The results show that the strength decreases and the plasticity increases with the increase of tensile testing temperature. The strength is lower and the hot plasticity is better when the test temperature is 350–400 °C. The heat rolling processing at industrial production condition also shows that the rolling crack is easily formed when the heat processing temperature is higher. The best rolling temperature of Al-Mg-Sc alloy is 350–420 °C. In addition, at the industrial production condition the heat processing pass and pass deformation ratio should be controlled. The pass deformation amount and rolling velocity should not be large at beginning. When deformation ratio is beyond 25%, the pass deformation ratio and rolling velocity should be gradually enhanced.

Key words: Al-Mg-Sc aluminum alloy; thermo-plasticity; hot rolling; microstructure

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