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7475铝合金ECAP的晶粒细化极限

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摘 要: 将等径弯曲通道变形应用于7475铝合金, 等效真应变达12。对7475铝合金在不同温度下ECAP变形后显微组织特征和晶粒细化极限进行了研究。结果表明: 变形温度从273K到773K, 7475铝合金的晶粒细化极限为0.29 ~1.90 μm , 且极限晶粒尺寸的倒数与变形温度的倒数成正比关系。在较高温度下, 组织中产生大量的沉淀相粒子能有效钉扎晶界, 阻碍晶粒长大, 使合金具有较好的组织热稳定性。

关键字: 7475铝合金; 等径弯曲通道变形; 晶粒细化极限; 沉淀相粒子

Microstructure and grain refinement limit of 7475 aluminum alloy after equal-channel angular pressing

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Abstract: Equal-channel angular pressing was conducted on a 7475 aluminum alloy at temperature from room temperature to 773K up to an equivalent true strain of 12. The grain refinement limit was dependent upon the precise pressing temperature, and the grain was refined to within the range from 0.29 to 1.9 μm by ECAP at these different temperatures. At higher temperature, it is apparent that these precipitates may be important in pinning the grain boundaries and thus increasing the thermal stability of the sub-micrometer-grained structure.

Key words: aluminum 7475 alloy; equal-channel angular pressing; grain refinement limit; precipitate

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