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冷轧变形对Inconel 718合金δ相γ″相析出行为的影响

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EFFECT OF COLD ROLLING ON THE PRECIPITATION BEHAVIOR OF δ PHASE AND γ″ PHASE IN INCONEL 718

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摘要 采用X射线衍射技术测定了冷轧Inconel 718合金在860℃加热温度下的δ相和γ″相含量，研究了冷轧变形对δ相和γ″相析出行为的影响。结果表明，冷轧变形影响δ相的析出形貌，随冷轧变形量增加，δ相由针状向颗粒状转变。δ相析出的重量百分数与时间的关系符合Avrami方程，随冷轧变形量增加，n值减小，α值增加。在860℃加热温度下，等温15min时已有γ″相析出，随时间增加，γ″相含量增加，达到最大值后又降低。在试验中给定的时间条件下，随冷轧变形量增加，γ″相含量降低，而δ相含量增加。

关键词： Inconel718合金 冷轧 析出相

Abstract: The weight percentages of δ phase and γ″ phase in Inconel 718 cold rolled to different reductions and then treated at 860℃ for different times were measured by the X ray diffraction method, and the effect of cold rolling on the precipitation behavior of δ phase and γ″ phase was investigated. The results show that cold rolling affects the morphology of δ phase. As cold rolling amount increases, the shape of δ phase changes gradually from needle to spheroid. The relationship between the weight percentage of δ phase and annealing time follows the Avrami equation. As cold rolling amount increases, the value of n decreases, whereas the value of α increases. In the case of 860℃ for 15 minutes, the γ″ phase has been precipitated in austenite matrix. With the increasing time, the weight percentage of γ″ phase increases to a maximum value, and then decreases. For a given time in this experiment, as cold rolling amount increases, the weight percentage of γ″ phase decreases, whereas the weight percentage of δ phase increases.

Keywords: Inconel 718 co ld ro lling p recip itates

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