

Influence of plastic deformation on occurrence of discontinuous precipitation reaction in Ni₃ at% In alloy

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Abstract

This present study is an attempt to investigate the plastic deformation effect on development of discontinuous precipitation reaction in Ni-3at% In alloy by applying three different pre-reduced samples by cold rolling ($\epsilon=10\%$, 30% and 60%). Differential scanning calorimetry (DSC), X-ray diffraction, optical microscopy and microhardness measurements were used as techniques of characterization. We have found that the occurrence of this reaction depends mainly on the deformation ratio before heat treatments. The variation of heating rate using the DSC technique has allowed us to calculate two kinetics parameters of precipitation, which are the Avrami exponent and the activation energy of the process.

Keywords Discontinuous precipitation; Plastic deformation; Phase; Grain boundary; Kinetics

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