

Tensile flow behavior in Inconel 600 alloy sheet at elevated temperatures

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### Abstract

Hot deformation behavior of Inconel 600 Ni-based superalloy was investigated up to the peak stress at elevated temperatures. Hot tensile tests were carried out in the temperature and strain rate ranges from 850 to 1150 °C and 0.001 to 1 s<sup>-1</sup>, respectively. The softening mechanism of dynamic recrystallization was analyzed using the Kocks - Mecking phenomenological approach and the irreversible thermodynamics model. The critical flow stress related to the onset of DRX increased with increasing strain rate due to a higher dislocation generation resulted from a higher strain rate. The constitutive equation relating flow stress, temperature, and strain rate was obtained based on the peak stresses. The constitutive analysis showed that the hot deformation behavior of the Inconel 600 Ni-based superalloy satisfied the hyperbolic sine constitutive equation.

Keyword : Dynamic recrystallization, Flow behavior, Inconel 600, Work hardening rate.