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The Microstructural Evolution of X45CrNiW189 Valve Steel during Hot Deformation

Authors : A. H. Meysami

Abstract : In this paper, the hot compression tests were carried on X45CrNiW189 valve steel (X45) in the temperature range of 1000–1200°C and the strain rate range of 0.004–0.5 s^(-1) in order to study the high temperature softening behavior of the steel. For the exact prediction of flow stress, the effective stress - effective strain curves were obtained from experiments under various conditions. On the basis of experimental results, the dynamic recrystallization fraction (DRX), AGS, hot deformation and activation energy behavior were investigated. It was found that the calculated results were in a good agreement with the experimental flow stress and microstructure of the steel for different conditions of hot deformation.

Keywords : X45CrNiW189, valve steel, hot compression test, dynamic recrystallization, hot deformation
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