

The effect of Thermomechanical Parameters on Final Microstructure of API X70 Steel after Dynamic Hot Deformation

Mohammad Hizombor, Reza Abdideh, Amin Asiaban - Khouzesan Oxin Steel Co., Ahvaz, Iran

ABSTRACT

With development of industries in recent years, need to the microalloyed steels with high strength and good ductility is revealed more strongly. One of the most effective and least costly methods to enhance spontaneous reinforcing strength and toughness in such steels is to refine Ferrite grains through a thermomechanical process. In this research the effect of deformation temperature and strain rate on the Ferrite grain size of microalloyed steel API X70, are investigated by hot compression test. Hot compression test is performed in temperature range of 780 – 1050°C, strain rates of 0.1 and 0.01S⁻¹ and fix Strain value of 0.8. Results of the experiments analyzed by hot flow curves obtained from mechanical tests and microstructures observations. Results show that increasing strain rate and decreasing of deformation temperature causes decrease in Ferrite grain size and increase of their volume fractions. In temperature of 780°C and strain rate of 0.1S⁻¹, ultra-fine Ferrite grains will appear in the microstructure.

KEYWORDS

API X70 steel, Thermomechanical Process, Grain Size, Deformation Temperature, Strain Rate.