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Hot deformation behavior and processing map of TRIP980

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ABSTRACT

The hot deformation behavior of Ti/V/Nb-containing Fe–0.31C (wt pct) 980MPa TRIP steel (TRIP980) was studied with a Gleeble-3500 thermomechanical simulator at 900–1150°C, and 0.01–10 s⁻¹. The results show that the peak stress decreases with the increasing temperature and decreasing strain rate. The deformation activation energy of the test steel is calculated to be 395.852 kJ/mol by regression analysis. Processing maps are developed on the basis of experimental data and using the principles of dynamic materials model (DMM). By analyzing the microstructure of specimen and the processing map of 0.3, 0.5, and 0.9, we find dynamic recrystallization occurs in the peak power dissipation efficiency domain, which is the optimum area of hot working.

KEYWORDS: TRIP980, hot deformation, processing map, dynamic recrystallization