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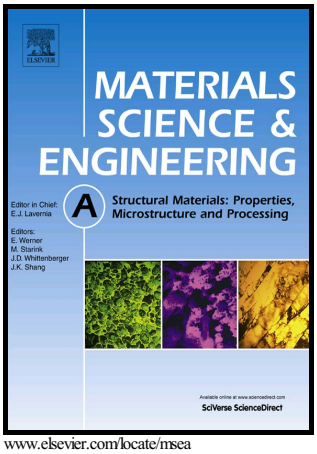

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Effect of intercritical rolling temperature on microstructure-mechanical property relationship in a medium Mn-TRIP steel containing δ ferrite

Z.P. Hu * [a], Y. B. Xu * [a], Y. Zou [a], R. D. K. Misra [b], D.T. Han [a], S.Q. Chen [a], D.Y. Hou [a]

[a]State Key Laboratory of Rolling and Automation, Northeastern University, Shenyang 110819, People's Republic China

[b]Laboratory for Excellence in Advanced Steel Research, Department of Metallurgical, Materials and Biomedical Engineering, University of Texas at El Paso, TX 79968, USA

huzhiping900401@126.com

yunbo_xu@126.com

dmisra2@utep.edu

*Corresponding to: State Key Laboratory of Rolling Technology and Automation, Northeastern University, P. O. Box 105, No. 11, Lane 3, Wenhua Road, Heping District, Shenyang 110819, People's Republic of China. Tel.: +86 24 83686642; fax: +86 24 23906472.

Abstract

We elucidate the influence of intercritical rolling temperature on the microstructural evolution, mechanical properties and work-hardening behavior of a hot-rolled Fe-0.2C-6.5Mn-3Al-0.1V medium Mn transformation-induced-plasticity (TRIP) steel containing δ-ferrite. Tensile strength of 966 MPa, total elongation of 42.6 % and yield strength of 705 MPa was obtained in the annealed steel subjected to a low intercritical rolling temperature. Rolling at a high intercritical rolling temperature promoted the partitioning of Mn from δ ferrite to prior austenite grains, and led to a martensitic matrix characterized by a fine lath structure. Subsequently, after intercritical annealing, the reversed austenite transformed from the martensitic matrix had high stability and small size. However, the reversed austenite with a high degree of Mn