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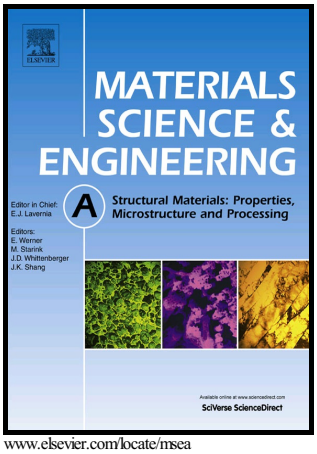


www.elsevier.com/locate/msea

PII: S0921-5093(18)30443-X
DOI: https://doi.org/10.1016/j.msea.2018.03.085
Reference: MSA36278

To appear in: *Materials Science & Engineering A*

Received date: 14 February 2018
Revised date: 20 March 2018
Accepted date: 21 March 2018

Cite this article as: Z.Y. Tang, J.N. Huang, H. Ding, Z.H. Cai and R.D.K. Misra, Austenite stability and mechanical properties of a low-alloyed ECAPed TRIP-aided steel, *Materials Science & Engineering A*, https://doi.org/10.1016/j.msea.2018.03.085

# Austenite stability and mechanical properties of a low-alloyed ECAPed TRIP-aided steel

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**Abstract**

Equal channel angular pressing (ECAP) and post-ECAP heat treatment were conducted on a Fe-1.38Mn-0.67Si-0.56Al-0.014Nb-0.18C transformation-induced plasticity (TRIP) aided steel. The microstructure of unECAPed TRIP sample was mainly composed of polygonal ferrite, bainite, retained austenite (RA) and lath martensite, while lath martensite was not observed in ECAPed TRIP samples. The stability of retained austenite (RA) for unECAPed TRIP sample was mainly influenced by the carbon content in RA, while for ECAPed TRIP steel, it was dominated by the size of RA. Comparing the mechanical properties of the unECAPed samples with the ECAPed samples, the ultimate tensile strength (UTS) changed slightly, but the total elongation (TEL) increased from 25.6% to 39.8%. The 4 passes ECAPed TRIP sample exhibited excellent mechanical properties with the product of tensile strength and total elongation (PSE) of 29.4 GPa %, which was a consequence of TRIP effect and cooperative deformation of ferrite, bainite and austenite.

**Keywords:** ECAP deformation, Austenite stability, TRIP effect, Mechanical properties