

Effects of Mechanical Test and Shape of Grain Boundary on Martensitic Transformation in Fe-Ni-C Steel

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Abstract : The purpose of the present paper is to model the behavior of metal alloy, type TRIP steel (Transformation Induced Plasticity), during solid/solid phase transition. A two-dimensional micromechanical model is implemented in finite element software (ZEBULON) to simulate the martensitic transformation in Fe-Ni-C steel grain under mechanical tensile stress of 250 MPa. The effects of non-uniform grain boundary and the criterion of mechanical shear load on the transformation and on the TRIP value during martensitic transformation are studied. The suggested mechanical criterion is favourable to the influence of the shear phenomenon on the progression of the martensitic transformation (Magee's mechanism). The obtained results are in satisfactory agreement with experimental ones and show the influence of the grain boundary shape and the chosen mechanical criterion (SMF) on the transformation parameters.

Keywords : martensitic transformation, non-uniform Grain Boundary, TRIP, shear Mechanical force (SMF)

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