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Annealing behavior of titanium bearing HSLA steel through electron back scattering diffraction

R. Ordonez

University of Pittsburgh, USA

Abstract

The annealing behavior of Ti-bearing HSLA steel was studied using the combined techniques of EBSD-KAM and Sub-grain Method. These techniques have been successfully used to assess the annealing behavior of other HSLA steels. Stored energy maps in the hot band, cold rolled and after annealing were constructed and analyzed. The combined usage of EBSD-KAM and the Sub-grain Method techniques were employed to calculate and compare the evolution of the stored energy and recrystallization during the annealing of the Ti-bearing HSLA steel. The presence of other microalloying elements such vanadium and niobium in steels may modify the kinetics of recovery and recrystallization of cold rolled and annealed steels. The effect of titanium in the recrystallization behavior of a cold rolled HSLA steel was examined by orientation mapping acquired by EBSD automation system. The Kernel Average Misorientation (KAM) has been used as a measure of local grain misorientation helping to define the recrystallization kinetics. In addition the grain boundary character distribution was study in the different stages of recrystallization.