

Abstract

In the present work the influence of intermediate annealing and the strain path during a two-stage cold rolling, on the microstructure and texture of 1 wt% Si non-oriented electrical steel was investigated. For a better understanding of favorable textures through different conditions, a Relative Texture (RT) was defined and calculated as “intensity of theta fiber/intensity of gamma fiber” ratio. The results showed that the samples with the highest RT have the lowest magnetic anisotropy. Also regardless of the intermediate annealing process, uni-directional rolling led to the identical relative texture (~ 2). On the contrary, the cross rolling samples exhibit different relative textures upon intermediate annealing. The cross rolled sample accompanied by intermediate annealing at $600\text{ }^{\circ}\text{C}$ resulted in the highest relative texture (~ 3). The proposed processing design led to significantly diminish gamma fiber which is deleterious for magnetic properties in non-oriented electrical steels.

Keywords: Non-oriented electrical steel, Texture, Magnetic properties, Cross rolling