Identification of annealed and recrystallized grains from EBSD maps - Application to an IF steel

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Abstract

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Abstract
EBSD orientation maps of recrystallized materials, at various stages of recrystallization, are powerful data in view of a better understanding of the mechanisms of recrystallization and grain growth. When handling such data, it is important to identify the metallurgical state of the grains detected in the EBSD orientation maps (deformed, annealed, recrystallized) and the evolution of their respective fractions. In this presentation, we will review the tools linked to EBSD maps post-processing (GOS - Grain Orientation Spread-, GOS/D -Grain Orientation Spread over Diameter of the grain-, GND - Geometrically Necessary Dislocations - density, cell size) which allow such an identification either as single parameters or through combination of some of them. The efficiency of the possible methods will be discussed thanks to a set of EBSD orientation maps obtained for an IF steel, initially cold

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rolled, and submitted to various heat treatments. Grain size as well as orientation changes, for the three subpopulations corresponding to the metallurgical states of the grains, along the heat treatment, will be discussed in relation with the mechanisms involved along primary recrystallization.

Keywords: Recrystalization, Annealing, EBSD, orientation map, IF steel