Micro-Chemistry Simulation of Al-Alloys with the ClaNG-Model

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Abstract

During the thermo-mechanical processing of aluminium alloys in commercial production lines the material experiences a complex history of temperature, time and strain paths, which result in alternating cycles of deformation and recrystallisation with the associated microstructural changes. Thus, a comprehensive understanding of the evolution of microstructure, microchemistry and crystallographic texture during the thermo-mechanical processing is an essential pre-requisite for the optimisation of Al-alloys, their processing and, most notably, the resulting materials properties.

In the present paper we will demonstrate this dependency for the production of sheet from Al-Fe-Mn-Si alloy AA 8006. In this alloy different homogenisation practices have strong impact on the resulting microchemistry, i.e. variation in solute level and precipitation, which affects the recrystallisation behaviour and, in turn, the final properties of the sheet. Especially, we will focus on the simulation of the micro-chemistry with a model designated *ClaNG* (Classical Nucleation and Growth) treating the evolution in microchemistry along the thermo-mechanical processing chain.