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Ferrite Transformation Behavior in Deformed Austenite During Continuous Cooling: Multi-Phase-Field Simulation and Experimental Study

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In order to predict mechanical properties of steel numerically, it is essential to simulate the formation of ferrite phase in steel-making process. In this study, microstructure evolution in austenite-to-ferrite transformation occurred in deformed austenite phase in hot working and continuous cooling process, is predicted by multi-phase-method. Furthermore, since experimental validation is important to estimate the ferrite nucleation behavior and identify unknown parameters, we conduct experiments of the hot working and subsequent continuous cooling process using a hot working simulator. By comparing experimental results with simulation outcome, the accuracy of the simulation model can be improved.

Keywords: Austenite-to-Ferrite Transformation, Hot Working, Continuous Cooling, Multi-Phase-Field Method