

Dynamic Recrystallization Modeling Using Multi-Phase-Field Method and Crystal-Plasticity Finite Element Method

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In dynamic recrystallization occurred during hot-working, hardening due to dislocation density accumulation by plastic deformation and softening due to nucleation and growth of dynamic recrystallized grains are occurred simultaneously. In this study, I develop a dynamic recrystallization model where the grain growth of dynamic recrystallized grains is expressed by multi-phase-field model and the plastic deformation is computed by crystal-plasticity finite element method as large deformation problem. A particle stimulated nucleation and bulge nucleation are tried to be reproduced by the developed model.

Keywords: Dynamic recrystallization, Hot-working, Phase-field method, Crystal-plasticity