

[PO-F1]Poster Session 1

Symposium F

2018年10月29日(月) 17:45 ~ 20:00 Poster Hall

[P1-36]On the Significance of the Higher-Order Neighbors for Abnormal Grain Growth and Recrystallization Nucleation

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Successful nucleation of abnormal grain growth and primary static recrystallization constitutes a rare event which affects in many cases only each thousandth (sub-) grain if at all. Consequently, the making of more quantitatively substantiated number density predictions can be improved by studying million-scale initial grain populations. Thanks to representative volume element (RVE) method development and software parallelization, simulating the evolution of such large grain populations has recently become possible.

This work details how 2d and 3d resolved RVE computer simulations with such millions of (sub-) grains within each single domain allow quantifying the process of preferential grain evolution during abnormal grain growth and nucleation to primary static recrystallization to hitherto unachieved statistical significance. By assessing not only the nearest but additionally higher-order neighbors of each grain more precise and accurate predictions at which sites nucleation will likely initiate are possible. Albeit, the study proves also that to definitely identify which grains succeed --- and as such also the number density --- requires assessing their entire topological event sequence surplus quantifying the distribution of their individual capillary- and stored elastic energy-induced grain boundary face migration speeds.