

2D Monte Carlo Simulation of Grain Growth under Transient Conditions

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Abstract : Extensive Monte Carlo Potts model simulations were performed on 2D square lattice to investigate the effects of simulated higher temperatures effects on grain growth kinetics. A range of simulation temperatures (KTs) were applied on a matrix of size 10002 with Q-state 64, dispersed with a wide range of second phase particles, ranging from 0.001 to 0.1, and then run to 100,000 Monte Carlo steps. The average grain size, the largest grain size and the grain growth exponent were evaluated for all particle fractions and simulated temperatures. After evaluating several growth parameters, the critical temperature for a square lattice, with eight nearest neighbors, was found to be $KTs = 0.4$.

Keywords : average grain size, critical temperature, grain growth exponent, Monte Carlo steps

Conference Title : ICMMS 2015 : International Conference on Metallurgy and Material Science

Conference Location : Zurich, Switzerland

Conference Dates : July 29-30, 2015