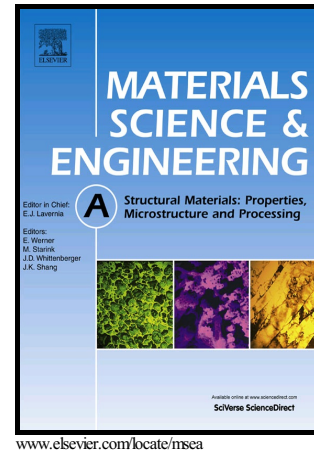


# Author's Accepted Manuscript

Modeling of Dynamic Recrystallization of Magnesium Alloy using Cellular Automata Considering Initial Topology of Grains

Lixiao Wang, Gang Fang, Lingyun Qian



PII: S0921-5093(17)31474-0  
DOI: <https://doi.org/10.1016/j.msea.2017.11.024>  
Reference: MSA35739

To appear in: *Materials Science & Engineering A*

Received date: 4 September 2017

Accepted date: 8 November 2017

Cite this article as: Lixiao Wang, Gang Fang and Lingyun Qian, Modeling of Dynamic Recrystallization of Magnesium Alloy using Cellular Automata Considering Initial Topology of Grains, *Materials Science & Engineering A*, <https://doi.org/10.1016/j.msea.2017.11.024>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Modeling of Dynamic Recrystallization of Magnesium Alloy using Cellular Automata Considering Initial Topology of Grains

Lixiao Wang<sup>a,b</sup>, Gang Fang<sup>a,b,\*</sup>, Lingyun Qian<sup>c</sup>

<sup>a</sup>Department of Mechanical Engineering, Tsinghua University, Beijing 100084, China

<sup>b</sup>State Key Lab of Tribology, Beijing, 100084, China

<sup>c</sup>School of Mechanical Engineering, University of Science and Technology Beijing, Beijing 100083, China

\*Corresponding author. Tel: 86-10-62782694. fangg@tsinghua.edu.cn

---

## Abstract

A two-dimensional cellular automaton (CA) model was established on MATLAB platform for quantitative and topographic simulation of the microstructure evolution of magnesium alloy ZM21 during hot deformation. A probabilistic approach was employed to improve the grain topology accuracy of discrete simulation method. Not only the average grain size but also more details including the grain size distribution of the measured microstructure were reflected in the initial conditions of CA simulation. Quantitative relationship between the parameters defined in the CA model and actual deformation condition was built to increase the applicability of the established model. The dynamic recrystallization (DRX) of magnesium alloy ZM21 was predicted using the CA model. Simulation results, including grain topology, average grain size, grain size distribution and DRX fraction were obtained and compared with experimental results. The good agreement between simulated and experimental results indicated that the established

Download English Version:

<https://daneshyari.com/en/article/7974240>

Download Persian Version:

<https://daneshyari.com/article/7974240>

[Daneshyari.com](https://daneshyari.com)