

论文

微合金钢热变形组织与性能演变的CA模拟

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**摘要:** 建立了预测微合金钢热变形奥氏体动态再结晶组织与性能演变的元胞自动机模型. 采用基于位错密度的动态再结晶理论, 主要考虑动态再结晶的形核、晶粒长大, 实现对动态再结晶过程晶粒形态、体积分数及晶粒尺寸的定量表征及其演变过程的可视化描述, 得了位错密度及流变应力等参数. 模拟得到的动态再结晶组织形貌及基于位错密度变化计算出的流变应力与实验结果吻合较好.

**关键词:** 元胞自动机 微合金钢 动态再结晶

SIMULATION OF MICROSTRUCTURE AND PROPERTIES EVOLUTION OF MICRO ALLOYED STEEL DURING HOT DEFORMATION BY CELLULAR AUTOMATON

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**Abstract:** A model for prediction of the dynamic recrystallization microstructure and properties evolution of hot deformed austenite for micro alloyed steel by cellular automaton (CA) was developed. The theoretical modeling of dynamic recrystallization was on the basis of dislocation density, and the nucleation and grain growth of dynamic recrystallization were considered. The microstructure evolution of austenite dynamic recrystallization, such as the grain shape, grain size and volume fraction, was predicted quantitatively and visually described. Moreover the distribution and variation of the dislocation density and flow stress were obtained. Meanwhile, the microstructure and variation of the flow stress of micro alloyed steel during hot deformation were measured by experiments. The measured results were in good agreement with the CA calculation results.

**Keywords:** cellular automaton micro alloyed steel dynamic recrystallization

收稿日期 2011-05-09 修回日期 2011-09-15 网络版发布日期 2011-12-16

DOI: 10.3724/SP.J.1037.2011.00293

基金项目:

国家自然科学基金项目51174249, 50974039和51034009, 国家重点基础研究发展计划项目2011CB606306-2及高等学校博士学科点专项科研基金项目20090042120005资助

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