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基于动态材料模型的材料热加工工艺优化方法

鲁世强¹, 李鑫¹, 王克鲁¹, 董显娟¹, 李臻熙², 曹春晓²

(1. 南昌航空工业学院 材料科学与工程学院, 南昌330063;
2. 北京航空材料研究院, 北京100095)

摘要: 基于动态材料模型理论的加工图技术被广泛用于设计和优化材料热加工工艺中, 以实现微观组织和性能的控制。综述动态材料模型的相关理论, 介绍基于动态材料模型的稳定变形区和失稳变形区的各种判据及其物理含义, 比较和分析各种判据的应用情况及其有效性, 对判据在某些情况下预测失败的原因进行分析, 指出利用各种判据优化材料热加工工艺时的选用原则。

关键字: 动态材料模型; 加工图; 变形稳定区判据; 变形失稳区判据; 工艺优化

Optimizing approach of materials hot working processes based on dynamic material model

LU Shi-qiang¹, LI Xin¹, WANG Ke-lu¹, DONG Xian-juan¹,
LI Zhen-xi², CAO Chun-xiao²

(1. School of Materials Science and Engineering,
Nanchang Institute of Aeronautical Technology, Nanchang 330063, China;
2. Beijing Institute of Aeronautical Materials, Beijing 10095, China)

Abstract: The approach of processing maps based on dynamic material model (DMM) theory was widely applied to design and optimize materials hot working processes with the aim of realizing the control of microstructures and properties of hot worked materials. The theories with respect to DMM were reviewed, and various criteria for the occurrence of flow stabilities and instabilities as well as their physical meaning were introduced respectively. The application and validity of various criteria were compared and analyzed, and the reason for predicting failure of criteria under some situations were analyzed. In addition, the selecting principle of the criteria was proposed to precisely optimize materials hot working processes.

Key words: dynamic material model; processing map; deformation stability criterion; deformation instability criterion; hot working process optimization

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地 址：湖南省长沙市岳麓山中南大学内 邮编： 410083

电 话： 0731-8876765, 8877197, 8830410 传真： 0731-8877197

电子邮箱： f-ysxb@mail.csu.edu.cn