

### 论文摘要

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## AZ31镁合金热变形本构方程

王忠堂<sup>1</sup>, 张士宏<sup>2</sup>, 齐广霞<sup>1</sup>, 王芳<sup>1</sup>, 李艳娟<sup>1</sup>

(1. 沈阳理工大学 材料科学与工程学院, 沈阳 110168;  
2. 中国科学院 金属研究所, 沈阳 110016)

**摘要:** 在温度为250~350 °C、应变速率为0.01~1.0 /s、最大变形程度为50%条件下对AZ31镁合金的高温流动应力变化规律进行热模拟实验研究。对双曲正弦模型的Arrhenius本构方程进行简化, 与原模型相比, 简化后的计算模型的计算结果相对误差小于4.2%。根据热模拟实验数据, 确定AZ31镁合金高温变形本构关系模型, 该本构关系模型的相对计算误差小于13%。实验确定的AZ31镁合金本构关系模型的适用温度范围为250~350 °C, 应变速率范围为0.01~1.0 /s。

**关键字:** AZ31镁合金; 本构关系; 流动应力; 热变形

## Constitutive equation of thermal deformation for AZ31 magnesium alloy

WANG Zhong-tang<sup>1</sup>, ZHANG Shi-hong<sup>2</sup>, QI Guang-xia<sup>1</sup>, WANG Fang<sup>1</sup>, LI Yan-juan<sup>1</sup>

(1. School of Materials Science and Engineering, Shenyang Ligong University, Shenyang 110168, China;  
2. Institute of Metal Research, Chinese Academy of Sciences, Shenyang 110016, China)

**Abstract:** The changing rules of flow stress at high temperatures for AZ31 magnesium alloy were studied by thermal simulation experiment, at temperature ranging from 250 to 350 °C, strain-rate from 0.01 to 1.0 /s, and the deformation degree of 50%. Arrhenius equation was simplified. Compared with the original model, the errors of this simplified model are less than 4.2%. According to the data of thermal simulation experiment, the model showing the constitutive thermal deformation for relationship of AZ31 magnesium alloy was determined. The relative errors between the calculation results by the model and experiment results are less than 13%. The suitable conditions of this model for AZ31 magnesium alloy are that the temperature ranges in 250–350 °C, and the strain rate 0.01–1.0 /s.

**Key words:** AZ31 magnesium alloy; constitutive relationship; flow stress; thermal deformation

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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](mailto:f-ysxb@mail.csu.edu.cn)