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综述评论

热弹性马氏体相变连续介质热力学研究

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摘要 介绍形状记忆合金热弹性马氏体相变连续介质热力学研究方法和最新进展，着重分析了在推广的非线性弹性力学的框架下，应用变分方法研究热弹性马氏体相变的理论和方法、存在的问题及发展趋势. 首先介绍如何计算马氏体相变24种变体的变形梯度，然后拓展非线性弹性力学，引入描述相变的多阱非凸弹性势能，进而讨论了界面能和非局部能对相变微结构和相变过程的影响的相关研究理论方法和进展.

关键词 马氏体相变 相变微结构 相变滞后 多阱非凸势能 变分方法

分类号

CONTINUUM THERMODYNAMICAL STUDIES ON THE THERMAL-ELASTIC MARTENSITIC TRANSFORMATION

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Abstract

The continuum thermodynamical studies on the thermal-elastic martensitic transformation in shape memory alloys and its recent progresses are reviewed in this paper. Within the frame of nonlinear elasticity, the variational method has been applied successfully in studying the thermal-elastic martensitic transformations. Some fundamentals of the theory and main approaches are discussed. The existing problems and possible future directions are analysed. With the deformation gradients of the 24 martensitic variants, the nonlinear elastic theory can be extended by introducing the multi-well potential energy function to describe the transition. The related theory and some recent studies on the effect of the interfacial energy and the non-local energy on the microstructures and the phase transition process are discussed.

Key words martensitic transformation microstructures of phase transition transition hysteresis multi-well potential variational method

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