

<<非均匀材料多场耦合行为的宏观理论>>

图书基本信息

书名：<<非均匀材料多场耦合行为的宏观理论>>

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前言

Intelligent material with multifield coupling properties is an important aspect of modern science and technology with applications in many industrial fields such as biomedical, electronic and mechanical engineering. It is well known that most engineering materials, composite materials in particular, are heterogeneous. The heterogeneity is either designed to meet engineering requirements for specific properties and functions or a natural evolution to adapt the historical architecture to changes in long term loadings and environment. Typical examples include functionally gradient materials and biomaterials. Functionally gradient materials are designed according to specific functions required by users. Biomaterials, on the other hand, remodel themselves to adapt to changes in the natural environment. Obviously, there are many heterogeneous materials in engineering including composites, defective materials and natural biomaterials. Heterogeneous materials exhibit complex properties at both microscopic and macroscopic level due to their anisotropy and interaction between components. Generally, there are two approaches used in investigating heterogeneous materials. One is the continuum mechanics approach, where the materials are assumed to be approximately homogeneous and continuous media. The other is the micromechanics approach, used for investigating the deformation and stress of heterogeneous materials by considering the interactions of the components in the microscopic scale. In recent years, research in macro-micro mechanics of composite materials has resulted in a great many publications including journal papers and monographs. Up to the present, however, no systematic treatment of macro-micro theory of heterogeneous multifield composites has been available. The objective of this book is to fill this gap, so that the reader can obtain a sound basic knowledge of the solution methods of multifield composites. This volume details the development of linear theories of multifield materials and presents up-to-date results on magneto-electro-elastic composites.

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内容概要

本书主要阐述非均匀材料多场耦合问题的基本理论和研究方法。在宏观和细观层次上研究各种天然材料、复合材料和先进功能材料中的热学、电学、化学和力学效应以及它们之间的相互作用。

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《非均匀材料多场耦合行为的宏观理论(英文版)》读者对象是物理、力学和材料类相关专业的研究人员和研究生。

Macro-Micro Theory on Multifield Coupling Behavior of Heterogeneous Materials discusses high performance structures using macro-microtheories and a micromechanics approach. The monograph is intended for specialists in materials science and applied mechanics.

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