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Composite Materials

Science and Engineering

This updated and enlarged third edition of a widely used text offers an integrated and completely up-to-date coverage of composite materials. Focusing on the relationship between structure and properties, it provides a well-balanced treatment of the mechanics and the materials science of composites, while not neglecting the importance of processing. The book has been revised and updated throughout, with new chapters on fatigue and creep of composites. The text presents a detailed description of how the various reinforcements (such as, glass, polyethylene, aramid, carbon), the materials in which they are embedded (ceramics, metals, polymers), and of the interfaces between them, control the properties of the composite materials at both the micro- and macro-levels. Extensive use is made of micrographs and line drawings to emphasize the importance of processing, microstructure, and properties in composite materials. Examples of practical applications in various fields are given throughout the book, and extensive references to the literature are provided.

Contents

Part I: Introduction. Reinforcements. Matrix Materials. Interfaces.- Part II: Polymer Matrix Composites. Metal Matrix Composites. Ceramic Matrix Composites. Carbon Fiber Composites. Multifilamentary Superconducting Composites.- Part III: Micromechanics of Composites. Macromechanics of Composites. Monotonic Strength and Fracture. Fatigue and Creep. Designing with Composites.- Appendices: A. Matrices. B. Fiber Packing in Unidirectional Composites. C. Some Important Units and Conversion Factors.- Problems.

Fields of interest

Ceramics, Glass, Composites, Natural Materials; Engineering Design; Polymer Sciences

Target groups

Graduate

Type of publication

Graduate/Advanced undergraduate textbook

 Chemistry and Materials Science

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