COMPOSITE MATERIALS: FROM THEORY TO APPLICATIONS

1st Edition

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PREFACE

Composite materials stand at the crossroads of various disciplines, embodying an intersection where diverse fields converge. The surge in student enrollment in courses pertaining to this domain is indicative of a burgeoning interest and recognition of its interdisciplinary nature.

Textbooks typically focus on either the mechanics or materials science dimensions of composite materials. However, "Composite Materials From Theory to Applications" uniquely delves into the materials science aspects of this field. Several factors influenced the decision to undertake this book project the considerable interest in composite materials, the interdisciplinary character of the subject, the imperative to reeducate practicing engineers, and the lack of a comprehensive introductory-level textbook.

Chapter 1 serves as an introduction to the subject matter. Subsequently, Chapters 2 through 4 delve into various types of composites, including MMC, PMC, and CMC. Chapter 5 focuses on the mechanical characterization of composites, while Chapter 6 explores their physical characterization. Machining operations performed on composites are discussed in Chapter 7, and Chapter 8 covers non-destructive testing techniques specific to composites. Chapter 9 delves into recent advancements and the future potential of composites, while Chapter 10 addresses about the natural fiber and their treatments.

Although fundamental concepts have been addressed in previous textbooks, the author deemed it crucial to augment the material with in-depth discussions on topics that have witnessed substantial advancements in recent decades. This encompasses subjects such as the machining of composites, non-destructive testing of composites, and life cycle assessment. Furthermore, the book explores advanced

methods of producing composites, including additive manufacturing (3D printing), pultrusion, resin transfer molding (RTM) etc.. Additionally, the text book integrates a multitude of physical and mechanical characterization techniques.

The book could serve as a foundational resource for both graduate and postgraduate students specializing in material sciences. Additionally, it will provide essential prerequisites for Ph.D. students engaged in research within the field of composite materials.

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Table of Content