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An Introduction to BIOCOMPOSITES

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An Introduction to BIOCOMPOSITES

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FOREWORD

Several years of cumulative research has been conducted on the usage of fiber reinforced composites for biomedical application, but no one source exists where this topic has been addressed in a systematic manner in a whole monograph. The focus of this book is on polymer composites applied to bioengineering.

Fiber reinforced composites have highly favorable mechanical and durability related properties. When compared with metals, they offer many advantages such as non-corrosiveness, radio translucency, good bonding properties and ease of repair. Since they also offer the potential for chair-side and laboratory fabrication, it is not surprising that fiber reinforced composites have potential for use in many applications in bioengineering.

For the potential applications to become successful applications, requires taking full advantage of the materials properties together with manufacturing techniques to realize the biomedical application needs. Hence, this book focuses on fiber-based composites applied to bioengineering. The book addresses three main areas: first, a comprehensive survey of biocomposites from the existing literature in various medical applications, primarily focusing on hard tissues related implants is presented. Second, mechanical designs and manufacturing aspects of various fibrous polymer matrix composites are described.

The third major issue addressed in the book is the design and development examples of several medical devices and implants using polymer composites. These devices are supposed to be used for hard tissue applications, including prosthetic socket, dental post, external fixator, bone plate,

orthodontic archwire, orthodontic bracket, total hip replacement, and composite screws and pins. Fabrication and mechanical testing of these have been shown, with comparisons with other clinically used medical devices. In this book, designing procedures for those medical devices using continuous fiber reinforced polymer matrix composites are described in sufficient detail. Based on these, comparable procedures can be followed if other critical designs are to be made.

Professor Eric Wintermantel
2003

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The Authors

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