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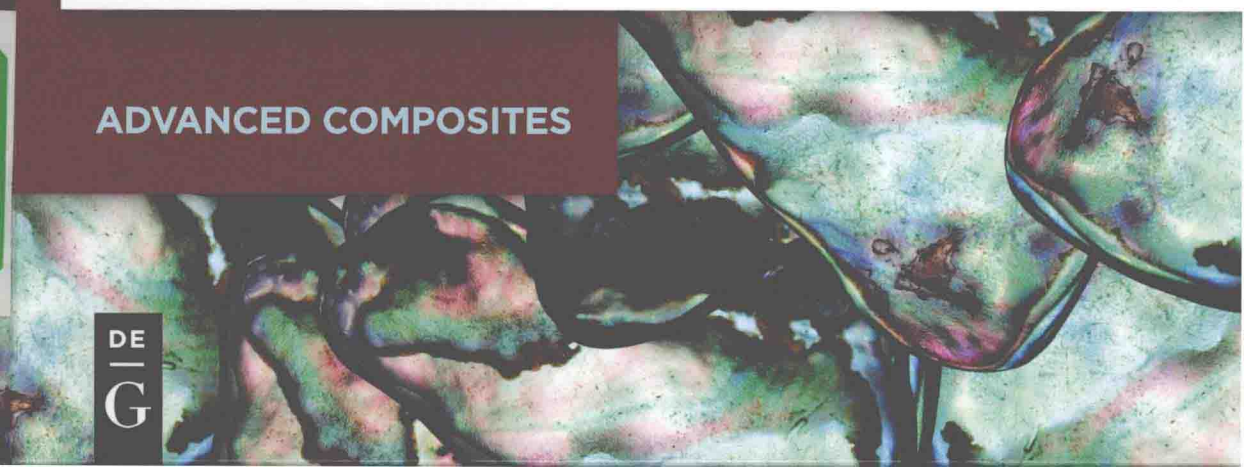

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The development of biomedical composites for application in the modern medical industry is making great progress. These composites are particularly attractive because they have properties comparable to those of tissues. They are widely used to repair, for example, tooth, bone, cartilage, and skin.
This book aims to provide recent information on biomedical composites (materials, manufacturing and engineering). It is useful for advanced undergraduate courses and at the postgraduate level and can serve as a reference for academics, researchers, materials scientists, mechanical and biomedical engineers, professionals in medical technology and related industries. The scientific interest of this book is evident for many important centers of research, laboratories and universities as well as the biomedical industry.

- Biomedical composite science and technology is an emerging, though very rapidly growing field: very important for current research as well as training of young scientists.
- It is a very timely and strongly interdisciplinary field which needs interaction between chemists, physicists, engineers and biologists.
- Biomedical composites are high potential materials due to special, new and unique mechanical and physical properties.

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Composite materials are engineered materials, made from two or more constituents with significantly different physical or chemical properties which remain separate on a macroscopic level within the finished structure. Due to their special mechanical and physical properties they have the potential to replace conventional materials.

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Biomedical Composites

Materials, Manufacturing and Engineering

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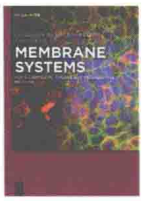

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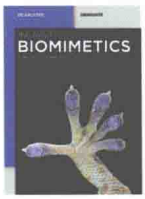

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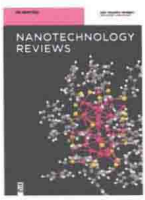

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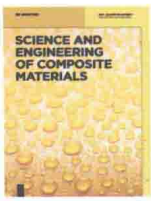

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Preface

Recently, biomedical composites have contributed to great developments in applications in the modern medical industry. With the current application of implants in the human body, it is clear that the implants should be compatible with the tissues. Therefore, biomedical composites are particularly attractive because their properties are comparable to those of the tissues. Innovations in biomedical composites, design and fabrication processes are increasing the performance of the tissues as well as other medical applications. Biomedical composites are widely used to repair, for example, tooth, bone, cartilage skin.

The present volume aims to provide recent information on biomedical composites (materials, manufacturing and engineering) in eight chapters. Chapter 1 of the book provides information on ceramic polymer composites for hard tissue applications. Chapter 2 is dedicated to HAp-metal based biocomposite coatings and characteristics of plasma deposited HAp-Ti/Ti6Al4V coatings. Chapter 3 describes hydrogels based on poly(vinylalcohol) for cartilage replacement. Chapter 4 contains information on polymer composites for cemented total hip replacements. Chapter 5 describes bioresorbable composites for bone repair. Chapter 6 describes bioactive glasses and glass-ceramics. Chapter 7 contains information on metal oxide-based one-dimensional titania nanostructures via electrospinning (characterization and antimicrobial applications). Finally, Chapter 8 is dedicated to hydrogels for biomedical applications.

The present volume can be used as a research book for final-year undergraduate engineering courses or as a topic on biomedical composites at the postgraduate level. Also, this book can serve as a useful reference for academics, researchers, materials, mechanical and biomedical engineers, professionals in medical technology and related industries. The scientific interest in this book is evident for many important centers of research, laboratories and universities as well as the biomedical industry. Therefore, I hope that this book will inspire and enthuse others to undertake research in this field of biomedical composites.

The Editor acknowledges De Gruyter for this opportunity and for their enthusiastic and professional support. Finally, I would like to thank all the chapter authors for their availability for this work.

September 2013

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