Book Review

Biosurfaces: a Materials Science and Engineering Perspective

Kantesh Balani, Vivek Verma, Arvind Agarwal, and Roger Narayan (Eds), John Wiley & Sons Inc., Hoboken, NJ, 2015, ISBN: 978-1-118-2997-5, 392 pp.

An increasing demand for repair of damaged and malfunctioning organs and novel diagnostic and therapeutic implant devices drive the research advances in the area of development of novel biomaterials with enhanced biocompatibility characteristics. A poor understanding of the complex interactions of synthetic materials with a biological host hinder progress and make the invention and engineering of new implant materials a more challenging task for material scientists and engineers.

This title is aimed at helping to summarize the current understanding of biological host responses to implant materials and provide a foundation for the design of materials with improved biocompatibility through manipulation of their surface elemental and functional make up, structure and topography. Useful as a graduate and post-graduate reference, this book guides the reader through concepts in biomaterials science and engineering, surface chemistry and engineering, and their interactions with the biological host environment by connecting science with real-life medical devices.

This book compiles 11 chapters written by different authors, and each chapter is supported with an authoritative list of references:

- 'Introduction to Biomaterials' by A. Pandey, R. K. Sharma and K. Balani
- 'Tissue Interaction with Biomaterials' by A. Pandey, A. K. Patel and K. Balani
- 'Host Response of Implanted Biomaterials' by P. S. M. Rajesh, S. Verma and V. Verma
- 'Fundamentals of Surface Modification' by F. Alam, V. Verma and K. Balani
- 'Multi-Length Scale Hierarchy in Natural Materials' by P. Benjwal and K. Balani
- 'Superhydrophobic Surfaces' by A. Gupta, M. R. Joshi, N. Mahato and K. Balani

- 'Surface Engineering and Modification for Biomedical Applications' by K. Balani, R. Narayan and A. Agarwal
- 'Laser Engineering of Surface Structures' by R. Narayan and P. Goering
- 'Processing and Nanomechanical Properties of Hydroxyapatite – Nanotube Biocomposite' by D. Lahiri and A. Agarwal
- 'Applications of Biomaterials' by S. Verma, A. K. Patel, B. Fatma, P. S. M. Rajesh, V. Singh, V. Verma and K. Balani
- 'Nanosafety, Nanosocietal, and Nanoethical Issues' by A. Agarwal and K. Balani

Especially noticeable are overviews on biological interactions and responses to implanted materials. These are adequately supported by a discussion and a brief list of important *in vitro* and *in vivo* experimental methods on material's biocompatibility analysis.

Manipulation and control over biomaterial surfaces often dictate outcomes: whether the implant is accepted or rejected by a biological host. Advances made in modifications of implant surfaces with organic matter and hydroxyapatite films are well introduced in this book. Addition of reviews on drug-eluting polymeric coatings, oxide film formation and ceramic coatings other than hydroxyapatite could make this title even more appealing to readers. It could be done at the expense of less important book chapters on superhydrophobicity and natural materials.

In conclusion, many students, researchers and engineers working on biomedical devices and materials could benefit from adding this book to their private libraries.

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