

# Preface

Electrospinning is a very attractive method used for the preparation of polymeric or composite fibers. During electrospinning, a high voltage is applied to a polymer solution to produce a polymer jet. With the fast evaporation of solvent combined with high extension ratios of the polymer solution, uniform diameter nanofibers can be produced. There has been an explosion of interest wherein these nanofibrous polymer mats are used for a variety of biomedical applications such as water treatment, biosensors, superhydrophobic surfaces, tissue engineering, wound healing and drug delivery.

The present volume entitled, “Biomedical Applications of Polymeric Nanofibers” attempts to provide a broad overview on the preparation techniques, structures and biomedical applications of different biopolymeric nanofibers. The book consists of 9 chapters:

Chapter 1 deals with the current designs of multiscale scaffolds and discusses their physico-chemical characteristics, as well as their potential applications in regenerative medicine. Chapter 2 focuses on the current state-of-the-art and future perspectives of stem cells and their differentiation on nanoengineered substrates for advanced tissue regeneration. Chapter 3 describes the methods utilized to create biomimetic structures for bone tissue engineering, as well as highlighting the advancements made in this field using these methods. Chapter 4 gives overviews of several tissue engineering approaches that have exploited composite design features and discusses new promising avenues for study. In addition, the drug- and growth-factor delivery capabilities of these systems will similarly be reviewed. Chapter 5 focuses on the development of artificial conduits for nerve regeneration using nanofibers as alternatives to the autograft. Chapter 6 deals with the fabrication of highly aligned nanofiber structures and their challenges and applications in the biomedical field. Chapter 7 summarizes the research and development related to the electrospinning of some common biocompatible polymers as well as an overview of their potential in many biomedical applications such as tissue engineering, wound dressing, carriers for drug delivery or controlled release, and enzyme

immobilization. Chapter 8 reviews the recent advances of electrospun nanofibrous scaffolds based on biodegradable and biocompatible polymers for controlled drug and biomolecule delivery applications. Chapter 9 summarizes the preparation and biomedical applications of silver nanoparticles incorporated into polymeric nanofibers.

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