

# Preface

Electrospinning, an electrohydrodynamic process, is a versatile and promising platform technology for the production of nanofibrous materials for tissue engineering and biomedical applications. This book presents the development of electrospun materials for tissue engineering and biomedical applications. With a strong focus on fundamental materials science and engineering, this book also looks at successful technology transfers to the biomedical industry, highlighting biomedical products already in the market as well as the requirements to successfully commercialize electrospun materials for potential use in tissue engineering and biomedical areas. This book is a valuable resource for materials and biomedical scientists and engineers wishing to broaden their knowledge in the field of tissue engineering and biomedical applications of electrospun fibrous materials.

The first part of this book covers the introduction to electrospinning of nanofibrous materials for biomedical and tissue engineering applications. The general requirements of electrospun materials for biomedical and tissue engineering are summarized. The biomedical industrial applications of electrospinning, and the innovations in the field and the products are listed. In addition, the possibility of creating 3D structures and using printing technologies for electrospun materials are discussed. Although a majority of the electrospun nanofibers are produced from solution-based electrospinning, the advantage of using melt electrospinning for tissue engineering is demonstrated. The last chapter of this part takes into consideration the *In vivo* safety evaluations of electrospun materials. The second part of this book has a focus on specific application areas of electrospun nanofibrous materials in the field of biomedical and tissue engineering. The application areas of electrospun nanofibrous materials and their scaffolds are discussed in detail for drug delivery, wound healing, dermal regeneration, bone and tendon/ligament repair, vascular tissue engineering, cardiac tissue engineering, neural tissue engineering, nanomedicine, cancer therapy, regenerative dentistry and, biosensors and sensors for diagnostics.

The Editors of this book serve as a Chair (Dr. Erich Kny) and Vice-Chair (Prof. Tamer Uyar) of COST Action MP1206—“Electrospun Nano-fibres for bio inspired composite materials and innovative industrial applications” (May 2013–May 2017). The MP1206 scientific network on Electrospinning has grown very extensively by gathering finally more than 400 scientists from 32 countries around the world. Under the MP1206 COST action, numerous international workshops and training schools have been organized, and participation in a number of international conferences has taken place concerning different application fields of electrospun nanofibers including healthcare, sensors, textiles, filtration, food and food packaging, agricultural, and energy. Since tissue engineering and biomedical applications of

electrospun fibrous materials are very promising and important application fields, we decided to publish a book on this topic. This book is one of the fruitful outcomes of our COST Action MP1206.

We are very grateful to Prof. Nabyl Khenoussi, the leader of our working group on “biomedical applications of electrospun nanofibres”, who has supported the idea of publishing such a book very strongly from the very beginning and has organized or coorganized a number of dedicated workshops on the topics of tissue engineering and biomedical applications. With his valuable activities, he has paved the ground and has set the foundations for finally being able to edit a book on biomedical applications of electrospun nanofibers. We are further grateful to all the authors of the individual chapters, who have devoted a lot of time and effort to write the chapters of the book and have responded to our many editorial demands in time and without complaints. Without their very much-valued help, such a collective work would not have been possible. Thank you very much! May this book be a valuable resource for experienced researchers as well as for students and beginners in this field!

**Tamer Uyar and Erich Kny**