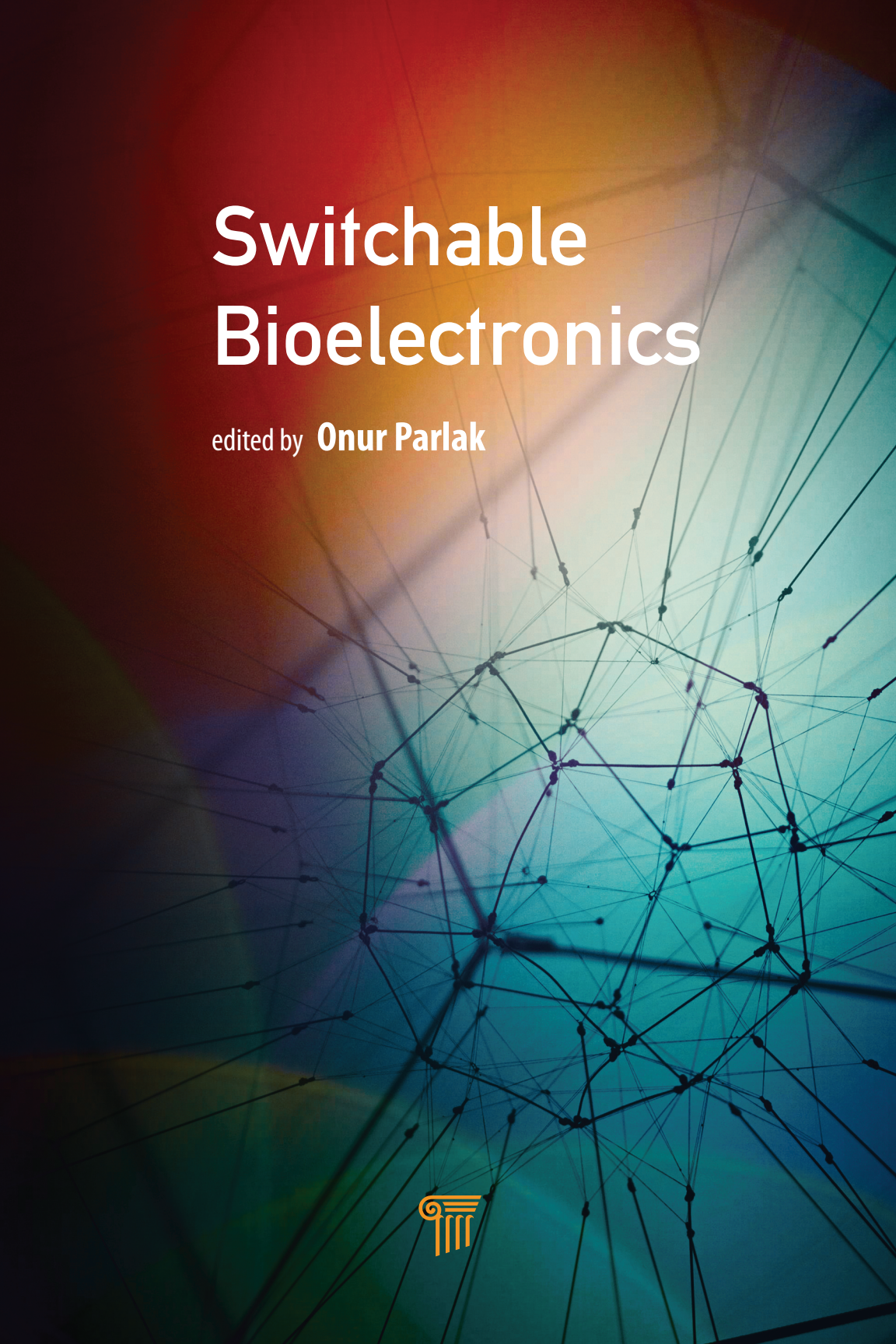
# Switchable Bioelectronics

edited by **Onur Parlak**



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# Contents

# Preface

I am very delighted to introduce this very first book on switchable bioelectronics to serve the scientific community with topical critical and tutorial reviews covering different aspects of polymer chemistry and engineering technologies.

In this book, we aim to give a collective summary and several applications of the rapidly emerging field of switchable interfaces and its implications for bioelectronics. We bring various aspects of the field together, represent the early breakthroughs and key developments, and highlight and discuss the future of switchable bioelectronics by focusing on bioelectrochemical processes based on mimicking and controlling biological environments with external stimuli. All these studies strive to answer the fundamental question How do living systems probe and respond to their surroundings? And, following on from that, how can one transform these concepts to serve the practical world of bioelectronics? The central obstacle to this vision is the absence of versatile interfaces that are able to control and regulate the means of communication between biological and electronic systems.

Here, all chapters focus on the overall progress made to date in building such interfaces at the level of individual biomolecules and highlight the latest efforts to generate

device platforms that integrate biointerfaces with electronics. In Chapter 1, Parlak introduces the general concept of dynamic interfaces for bioelectronics and give an overview of the importance of materials and systems for switchable bioelectronics, introducing the reader to different biointerfaces. In Chapter 2, Beyazit pieces together different types of stimuli-responsive polymers and applications. In Chapter 3, Ozaydin-Ince et al. lay special emphasis on stimuli-responsive polymers with tunable release kinetics and describe the importance of polymer design for delivery applications. Moving towards applying these principles to develop innovative devices for bioelectronic applications, Yildiz et al., in Chapter 4, review the field of conformational switching in nanofibers for gas sensing applications. Finally, in Chapter 5, Basan and Yılmaz focus on molecular imprinting polymers as recognition elements for sensing applications. Each of these chapters concludes with a discussion of key examples in their respective areas and their implications in the field of switchable bioelectronics.

I hope you will enjoy going through this book as much as I have enjoyed putting it together. I thank all the contributing authors for their enthusiasm and patience, and the editorial team of Jenny Stanford Publishing for all the diligent work enabling the publication of this book.

**Onur Parlak**