

Preface

The first organic materials-based triboelectric nanogenerator (TENG) was invented by my group in 2012. Using the electrostatic charges created on the surfaces of two dissimilar materials when they are brought into physical contact, the contact-induced triboelectric charges can generate a potential drop when the two surfaces are separated by a mechanical force, which can drive electrons to flow between the two electrodes built on the top and bottom surfaces of the two materials. The fundamental studies and technological applications of TENG are experiencing a rapid development and its applications cover a wide range of fields. This book provides a comprehensive review about the four modes of the TENGs, their theoretical modeling, and the applications of TENGs for harvesting energy from human motion, walking, vibration, mechanical triggering, rotating tire, wind, flowing water, and more. A TENG can also be used as a self-powered sensor for actively detecting the static and dynamic processes arising from mechanical agitation using the voltage and current output signals of the TENG, respectively, with potential applications as mechanical sensors and for touch pad and smart skin technologies. The potential of TENG for harvesting ocean wave energy is also discussed as a potential approach for the blue energy. The objective of writing this book is to systematically introduce the TENG, so that it can serve as a text book and a reference book for promoting the fundamental development and technological applications of TENG.

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