

Preface

Organic optoelectronic materials, including organic semiconductors, organic conductors, organic superconductors, conducting polymers, and conjugated polymers, have attracted great attentions since the discoveries of organic semiconductors in the 1950s and conducting polymers in the 1970s. Their novel physicochemical properties and promising applications in organic field-effect transistors (OFET), organic/polymer light-emitting diodes (OLED/PLED), and organic/polymer solar cells [OSC/PSC or OPV (organic photovoltaics)] stimulated and promoted broad research interests and development of new materials and new devices based on them.

As a book in the series *Lecture Notes in Chemistry*, this book is designed for graduate students and researchers who look for up-to-date knowledge on organic optoelectronic materials and their applications in OFETs, OLEDs/PLEDs, OPVs, and transparent conducting electrodes. This book can also be used as a reference book or text book for related researchers and graduate students. The molecular structures, synthetic methods, and physicochemical and optoelectronic properties of organic optoelectronic materials are introduced and described in detail. The structures and working mechanisms of organic optoelectronic devices are elucidated. The key scientific problems and future research directions of organic optoelectronic materials are also addressed. In more detail, Chaps. 1 and 2 cover the development history and physicochemical properties of organic semiconductors, organic conductors, organic superconductors, and conducting polymers. Chapter 3 introduces OFETs and the molecular structures and charge-carrier mobilities (hole and electron mobilities) of various *p*-type and *n*-type organic semiconductors. Chapters 4 and 5 describe photovoltaic materials and devices for OPVs based on organic small molecules and conjugated polymers, respectively. Chapters 6 and 7 elucidate electroluminescent materials and devices for OLEDs based on organic small molecules and PLEDs based on conjugated polymers, respectively. Chapter 8 outlines the knowledge of transparent conducting polymers for application in flexible transparent electrodes.

The research field of organic optoelectronic materials and devices has been developing quickly in recent years. The contents of this book may be limited by the knowledge and the understanding of the authors, and there may be some errors or mistakes. Any comments and suggestions or questions about the contents of this book are welcomed by me or by the contributing authors.

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