

Preface

It is my great pleasure to present our book “P3HT Revisited – from Molecular Scale to Solar Cell Devices” in the Springer series *Advances in Polymer Science*. The book deals with poly(3-hexylthiophene), P3HT, which was first synthesized in the early 1990s and has become the work-horse or “fruit fly” (see chapter by Andrienko and coworkers, “Morphology and Charge Transport in P3HT: A Theorist’s Perspective”) of the opto-electronic community. The choice of authors – with backgrounds and expertise in polymer synthesis, structure analysis, polymer crystallization and morphology, transistor and solar cell device preparation and characterization, and polymer theory – is representative of the large community of scientists that have worked and are *still* working on this fascinating conjugated semicrystalline polymer. As highlighted by Moulé et al. (see chapter “P3HT-Based Solar Cells: Structural Properties and Photovoltaic Performance”), the research activity on P3HT is enormous, as demonstrated by the large number of articles published each year on this topic.

The book is structured as follows: The first chapter gives an overview of historic and modern routes for P3HT synthesis. The second and third chapters focus on the morphology of P3HT, which is dominated by its semicrystalline nature. The fourth chapter is devoted to field-effect transistors based on P3HT and other polythiophene polymers with high mobilities. A theorist’s perspective on morphology and charge transport is given in the fifth chapter. The sixth chapter contains an introduction to and review on P3HT bulk heterojunction solar cells in combination with the fullerene derivative phenyl-C61-butyric acid methyl ester (PCBM).

Summarizing, we have tried to draw a consistent picture of P3HT at different length scales ranging from the molecular scale over the mesoscopic scale to the device level. The P3HT structure on the molecular and mesoscopic scale has been correlated with its optical, electrochemical, electronic, and opto-electronic properties, which provide the basis for its performance in transistor and solar cell devices.

Last, but not least, I express my sincere thanks to all the authors of this book for their contributions and to Dr. Tobias Wassermann and his team for their support.

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