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Zhen Fang
Editor

Pretreatment Techniques for Biofuels and Biorefineries

Springer

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Preface

Pretreatment is the first and the most crucial step for effectively using biomass and for developing new routes to produce biofuels and value-added products. Pretreatment is a process intensive step and, for example, it is the single most expensive processing step in cellulosic ethanol production, making up approximately 20–40 % of the product cost. Although there are many research articles that focus on pretreatment techniques, it was felt by the authors that there was a lack of a comprehensive source where one could turn to understand the many possible methods and their range of application.

This text includes 19 chapters contributed by world-leading experts on pretreatment methods for biomass. It gives an extensive coverage for different types of biomass (e.g. molasses, sugar beet pulp, cheese whey, sugarcane residues, palm waste, vegetable oil, straws, stalks and wood), for different types of pretreatment approaches (e.g. physical, thermal, chemical, physical–chemical and biological) and for methods that show subsequent production of biofuels and chemicals such as sugars, ethanol, extracellular polysaccharides, biodiesel, gas and oil. In addition to traditional methods such as steam, hot-water, hydrothermal, diluted acid, organosolv, ozonolysis, sulfite, milling, fungal and bacterial, microwave, ultrasonic, plasma, torrefaction, pelletization, gasification (including biogas) and liquefaction pretreatments, novel techniques (e.g. nano- and solid-catalysts, organic electrolyte solutions and ionic liquids) are introduced and discussed.

Each chapter was strictly reviewed externally by experts in biofuels listed in the Acknowledgement. The chapters are categorized into seven parts:

- Part I: Biopretreatment
- Part II: Thermal Pretreatment
- Part III: Chemical Pretreatment
- Part IV: Physicochemical Pretreatment
- Part V: Gasification, Liquefaction and Biogas
- Part VI: Novel Pretreatment Techniques
- Part VII: Treatment of Different Types of Biomass

This book offers a review of state-of-the-art research and provides guidance for future paths for developing pretreatment techniques of biomass for biofuels in the fields

of biotechnology, microbiology, chemistry, materials science and engineering. It is our intention to provide a systematic introduction to pretreatment techniques. It is an accessible reference book for students, researchers, academicians and industrialists in biorefineries.

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May 30, 2012 Zhen Fang
Kunming

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