1. Record Nr. UNINA9910779718903321

Autore	Basu Prabir <1946->
Titolo	Biomass gasification, pyrolysis and torrefaction : practical design and theory / / Prabir Basu, Dalhousee University and Greenfield Research Incorporated
Pubbl/distr/stampa	Amsterdam ; ; Boston, : Elsevier/AP, 2013 London : , : Academic Press, , 2013
ISBN	0-12-396543-8
Edizione	[2nd ed.]
Descrizione fisica	1 online resource (xix, 530 pages) : illustrations (some color)
Collana	Gale eBooks
Disciplina	662.88
Soggetti	Biomass gasification Pyrolysis
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Front Cover; Biomass Gasification, Pyrolysis, and Torrefaction; Copyright Page; Dedication; Contents; Preface; Acknowledgments; About the Author; 1 Introduction; 1.1 Biomass and its Products; 1.1.1 Products of Biomass; 1.1.1.1 Chemicals Industries; 1.1.1.2 Energy Industries; 1.1.1.3 Transport Industries; 1.1.1.4 Environmental Industries; 1.2 Biomass Conversion; 1.2.1 Biochemical Conversion; 1.2.2 Thermo chemical Conversion; 1.2.2.1 Combustion; 1.2.2.2 Pyrolysis; 1.2.2.3 Torrefaction; 1.2.2.4 Gasification; 1.2.2.5 Liquefaction; 1.3 Motivation for Biomass Conversion; 1.3.1 Renewability Benefits 1.3.2 Environmental Benefits 1.3.2.1 Carbon-Neutral Feature of Biomass; 1.3.2.2 Sulfur Removal; 1.3.2.3 Nitrogen Removal; 1.3.2.4 Dust and Hazardous Gases; 1.3.3 Sociopolitical Benefits; 1.4 Historical Background; 1.5 Commercial Attraction of Gasification; 1.5.1 Comparison of Gasification and Combustion; 1.6 Brief Description of Some Biomass Conversion Processes; 1.6.1 Torrefaction; 1.6.2 Pyrolysis; 1.6.3 Combustion of Carbon; 1.6.4 Gasification of Carbon; 1.6.5 Syngas Production; 1.6.6 Methanol Synthesis; 1.6.7 Ammonia Synthesis; 1.6.8 Fischer-Tropsch Reaction; 1.6.9 Methanation Reaction Symbols and Nomenclature 2 Economic Issues of Biomass Energy Conversion; 2.1 Introduction; 2.2 Biomass Availability and Products;

2.2.1 Availability Assessment; 2.2.1.1 Energy Crop; 2.2.1.2 Biomass Cost; 2.2.2 Product Revenue from Biomass Conversion; 2.2.2.1 Energy Revenue; 2.2.2.2 Revenue from Chemicals; 2.2.2.3 Revenue from Secondary Fuel Production; 2.3 Biomass Conversion Process Plant Equipment and Cost; 2.3.1 Biomass Collection System; 2.3.2 Preprocessing; 2.3.3 Gasifier Cost; 2.3.4 Torrefier Cost; 2.3.5 Pyrolyzer Cost; 2.3.6 Comparison of Capital Costs; 2.4 Financial Analysis
2.4.1 Capital Cost Adjustment for Size and Time 2.4.1.1 Scale-Up with Size; 2.4.1.2 Scale-Up with Time; 2.4.2 Capital Requirement; 2.4.3 Operation and Maintenance Cost; 2.4.3.1 Carrying Charge; 2.4.3.2 Revenue Requirement; Symbols and Nomenclature; 3 Biomass Characteristics; 3.1 Introduction; 3.2 What Is Biomass?; 3.2.1 Biomass Formation; 3.2.2 Types of Biomass; 3.2.2.1 Lignocellulosic Biomass; 3.2.2.2 Crops and Vegetables; 3.2.2.3 Waste Biomass; 3.3 Structure of Biomass; 3.3.1 Structure of Wood; 3.3.2 Constituents of Biomass Cells; 3.3.2.1 Cellulose; 3.3.2.2 Hemicellulose; 3.3.2.3 Lignin
3.4 General Classification of Fuels 3.4.1 Atomic Ratio; 3.4.2 Relative Proportions of Lignocellulosic Components; 3.4.3 Ternary Diagram; 3.5 Properties of Biomass; 3.5.1 Physical Properties; 3.5.1.1 Densities; True Density; Apparent Density; Bulk Density; Biomass (Growth) Density; 3.5.2 Thermodynamic Properties; 3.5.2.1 Thermal Conductivity; 3.5.2.2 Specific Heat; 3.5.2.3 Heat of Formation; 3.5.2.4 Heat of Combustion (Reaction); 3.5.2.5 Heating Value; 3.5.2.6 Ignition Temperature; 3.6 Composition of Biomass; 3.6.1 Ultimate Analysis; 3.6.2 Proximate Analysis; 3.6.2.1 Volatile Matter
3.6.2.2 Ash

Sommario/riassunto

Biomass is the most widely used non-fossil fuel in the world. Biomass resources show a considerable potential in the long-term given the increasing proliferation of dedicated energy crops for biofuels. The second edition of Biomass Gasification and Pyrolysis is enhanced with new topics, such as torrefaction and cofiring, making it a versatile resource that not only explains the basic principles of energy conversion systems, but also provides valuable insight into the design of biomass conversion systems. This book will allow professionals, such as engineers, scientists, and op