



which are the primary sources of fuel in the transportation sector, are also being rapidly depleted at an alarming rate. Therefore, to combat these global issues without increasing our carbon footprint, we must look for renewable resources to produce chemicals and biomaterials. In that context, agricultural waste materials are gaining popularity as cost-effective and abundantly available alternatives to fossil resources for the production of a variety of value-added products, including renewable fuels, fuel components, and fuel additives. Handbook of Biomass Valorization for Industrial Applications investigates current and emerging feedstocks, as well as provides in-depth technical information on advanced catalytic processes and technologies that enable the development of all possible alternative energy sources. The 22 chapters of this book comprehensively cover the valorization of agricultural wastes and their various uses in value-added applications like energy, biofuels, fertilizers, and wastewater treatment. Audience The book is intended for a very broad audience working in the fields of materials sciences, chemical engineering, nanotechnology, energy, environment, chemistry, etc. This book will be an invaluable reference source for the libraries in universities and industrial institutions, government and independent institutes, individual research groups, and scientists working in the field of valorization of biomass.

Food Engineering Handbook, Two-Volume Set provides a stimulating and up-to-date review of food engineering phenomena. It also addresses the basic and applied principles of food engineering methods used in food processing operations around the world. Combining theory with a practical, hands-on approach, this set examines the thermophysical properties and modeling of selected processes such as chilling, freezing, and dehydration, and covers the key aspects of food engineering, from mass and heat transfer to steam and boilers, heat exchangers, diffusion, and absorption. Comprised of Food Engineering Handbook: Food Engineering Fundamentals and Food Engineering Handbook: Food Process Engineering, this comprehensive resource: Explains the interactions between different food constituents that might lead to changes in food properties Describes the characterization of the heating behavior of foods, their heat transfer, heat exchangers, and the equipment used in each food engineering method Discusses rheology, fluid flow, evaporation, distillation, size reduction, mixing, emulsion, and encapsulation Provides case studies of solid-liquid and supercritical fluid extraction and food behaviors Explores fermentation, enzymes, fluidized-bed drying, and more Presenting cutting-edge information on new and emerging food engineering processes, Food Engineering Handbook, Two-Volume Set offers a complete reference on the fundamental concepts, modeling, quality, safety, and technologies associated with food engineering and processing operations today.

Despite the available general literature in intelligent control, there is a definite lack of knowledge and know-how in practical applications of intelligent control in drying. This book fills that gap. Intelligent Control in Drying serves as an innovative and practical guide for researchers and professionals in the field of drying technologies, providing an overview of control principles and systems used in drying operations, from classical to model-based to adaptive and optimal control. At the same time, it lays out approaches to synthesis of control systems, based on the objectives and control strategies, reflecting complexity of drying process and material under drying. This essential reference covers both fundamental and practical aspects of intelligent control, sensor fusion and dynamic optimization with respect to drying.

Regulating Safety of Traditional and Ethnic Foods

Low-Temperature Energy Systems with Applications of Renewable Energy

Handbook of Industrial Drying

Advanced Drying Technologies for Foods

Drying Technologies For Foods

User Guide to Process Integration for the Efficient Use of Energy

*Pinch Analysis for Energy and Carbon Footprint Reduction is the only dedicated pinch analysis and process integration guide, covering a breadth of material from foundational knowledge to in-depth processes. Readers are introduced to the main concepts of pinch analysis, the calculation of energy targets for a given process, the pinch temperature, and the golden rules of pinch-based design to meet energy targets. More advanced topics include the extraction of stream data necessary for a pinch analysis, the design of heat exchanger networks, hot and cold utility systems, combined heat and power (CHP), refrigeration, batch- and time-dependent situations, and optimization of system operating conditions, including distillation, evaporation, and solids drying. This new edition offers tips and techniques for practical applications, supported by several detailed case studies. Examples stem from a wide range of industries, including buildings and other non-process situations. This reference is a must-have guide for chemical process engineers, food and biochemical engineers, plant engineers, and professionals concerned with energy optimization, including building designers. Covers practical analysis of both new and existing processes Teaches readers to extract the stream data necessary for a pinch analysis and describes the targeting process in depth; includes a downloadable spreadsheet to calculate energy targets Demonstrates how to achieve the targets by heat recovery, utility system design, and process change Updated to include carbon footprint, water and hydrogen pinch, developments in industrial applications and software, site data reconciliation, additional case studies, and answers to selected exercises*

Computational Tools at Different Scales

Energy Efficiency in Industry