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**Recent developments in solvent absorption technologies at the
CO₂CRC in Australia**

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Abstract

A 2.5 TPD post-combustion CO₂ capture plant for brown coal and a 0.5 TPD pre-combustion CO₂ capture IGCC process have been designed and are being built in Victoria, Australia to assess developments in solvent absorption capture technologies. In this paper, the flowsheets developed for these processes will be discussed along with the underpinning research in the following areas:

- New contact equipment – recent work has shown that the SMR packing has enhanced performance over structured packing and standard Pall rings.
- The influence of promoters to enhance kinetics – using a wetted-wall column, experiments have been conducted with boric acid added to potassium carbonate solvent with results showing an enhancement in CO₂ absorption rates.
- The influence of flue gas impurities – post-combustion impurities, including SO_x and NO_x, have been studied with potassium carbonate to evaluate their effects on CO₂ absorption.
- Process modeling – Aspen Plus[®] simulations have been developed to predict column performance and the effects of impurities on the equilibrium relationship.

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Keywords: solvent absorption; carbon dioxide; potassium carbonate; packed column; promoters; SO_x, NO_x, post-combustion, pre-combustion

1. Introduction

Removal of greenhouse gases from our atmosphere is vital in preventing the effects of climate change. The current technologies available for the separation of carbon dioxide from both pre- and post-combustion flue gases

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Recent Developments in Alcoholism Marc Galanter, 2013-11-21 From the President of the American Society of Addiction Medicine Recent Developments in Alcoholism Volume 10 is a major contribution to the literature of addiction medicine This volume ru cohoh and Cocaine Similarities and Differences contains an impressive collection of chapters from the basic research epidemiological and clinical research perspectives as well as articles that address the relative policy issues and clinical application and patient care concerns It also sends a message to those who would still distinguish between alcohol and drugs or legal and illegal drugs In the research laboratory in the intentions and behavior of the user and by the clinician such distinctions have never been upheld The first section Clinical Pathology includes chapters on the role of alcohol in cocaine dependence dual diagnosis empirical and developmental humanistic approaches and on neuroendocrine and catecholamine levels in humans during administration and withdrawal of cocaine and alcohol emer gency room evaluation of cocaine associated neuropsychiatric disorders and clinical and pharmacological interactions of alcohol and cocaine These chap ters written by authors who are preeminent in their fields offer a broad perspective to both the researcher and the clinician on relevant issues in clinical pathology

The Latest Research and Development of Minerals in Human Nutrition ,2021-06-08 The Latest Research and Development of Minerals in Human Nutrition Volume 96 in the Advances in Food and Nutrition Research series highlights new advances in the field with this new volume presenting interesting chapters written by an international board of authors Provides the authority and expertise of leading contributors from an international board of authors Presents the latest release in the Advances in Food and Nutrition Research series Updated release includes the Latest Research and Development of Minerals in Human Nutrition

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Current Developments in Biotechnology and Bioengineering Sunita Varjani, Ashok Pandey, R. D. Tyagi, Huu Hao Ngo, Christian Larroche, 2020-02-19 Current Developments in Biotechnology and Bioengineering Emerging Organic Micropollutants summarizes the current knowledge of emerging organic micropollutants in wastewater and the possibilities of their removal elimination This book

attempts a thorough and exhaustive discussion on ongoing research and future perspectives on advanced treatment methods and future directions to maintain and protect the environment through microbiological nanotechnological application of membrane technology molecular biological and by policymaking means In addition the book includes the latest developments in biotechnology and bioengineering pertaining to various aspects in the field of emerging organic micropollutants including their sources health effects and environmental impacts

New and Future Developments in Microbial Biotechnology and Bioengineering Vijai Kumar Gupta, Susanne Zeilinger, Harikesh Bahadur Singh, Irina Druzhinina, 2020-07-12 New and Future Developments in Microbial Biotechnology and Bioengineering Recent Developments in Trichoderma Research covers topics on Trichoderma biodiversity strain improvement and related researches in bioprocess technology chemical engineering bioremediation process secondary metabolite production Protein production plant disease resistance and biocontrol technology This book includes unique compilations of different chapters with emerging issues in the area of Trichoderma research and its related importance in the Biochemical Industry Agri Food sector Includes recent developments on Trichoderma research in plant biotechnology agriculture and in the environment Provides a detailed and comprehensive coverage of the biodiversity and biochemistry of Trichoderma Covers potential applications of Trichoderma in biotechnology including secondary metabolites and protein engineering

Recent Developments in Sustainable Infrastructure (ICRDSI-2020)—Structure and Construction Management B. B. Das, Christy P. Gomez, Benu. G. Mohapatra, 2022-04-25 This book includes selected papers from the International Conference on Recent Developments in Sustainable Infrastructure ICRDSI 2020 and consists of themes pertaining to structural engineering and construction technology and management

Recent Developments in Particle Physics and Cosmology G.C. Branco, Q. Shafi, J.I. Silva-Marcos, 2012-12-06 The NATO Advanced Study Institute 2000 was held in Cascais a small town located in a renowned beach resort area near Lisbon The aim of the Meeting was to provide an overview and to cover the recent developments in some of the most important topics in Particle Physics and Cosmology including Neutrino Physics CP violation B Physics Baryogenesis Dark Matter Inflation Supersymmetry Unified Theories Large Extra Dimensions and M theory In the NATO ASI 2000 we had the privilege to have among the lecturers some of the most prominent physicists working in the fields of Particle Physics and Cosmology Furthermore there was a strong participation by a large number of young scientists including graduate students and post docs who had an opportunity to learn about the latest developments in the field and discuss the various topics with lecturers and other participants The enthusiasm of the young participants the generosity of the lecturers in giving their time to participate in open discussions and debates together with the social events and the pleasant environment of Cascais all contributed to the great success of the Meeting We are very grateful to Camara Municipal de Cascais for their support and organization of the reception in the beautiful Palace Condes Castro de Guimaraes and we are also specially grateful to colonel Eugenio de Oliveira for his support to commander A Monteiro de Macedo and to Mr

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Biotechnology and Bioengineering Ashok Pandey,Ranjna Sirohi,Christian Larroche,Mohammad Taherzadeh,2022-08-18
Advances in Bioprocess Engineering the latest release in the Current Developments in Biotechnology and Bioengineering series provides a comprehensive overview of bioprocess systems kinetics bioreactor design batch and continuous reactors and introduces key principles that enable bioprocess engineers to engage in analysis optimization and design with consistent control over biological and chemical transformations The bioprocessing sector is also updating its technologies with state of the art techniques to keep up with the rising demand of the industry and R D This book covers these aspects taking readers through a step by step journey of bioprocessing while also guiding them towards a new era and future Covers state of the art technological advancements in the field of bioprocessing Includes design and scale up of bioreactors monitoring and control systems advances in upstream and downstream processing Includes design and development of fermentation processes such as the suitability of experimental design full factorial central composite design Box Behnken Plackett Burman and more

New Developments in Dietary Fiber Ivan Furda,Charles J. Brine,2013-04-09 It has been acknowledged that the physiological effects of dietary fiber are an exceedingly complex matter which requires a multidisciplinary research effort The increased scientific involvement of the medical community nutritionists chemists and physicists is not only warranted but it has become mandatory This is because we are entering a more advanced research phase in which the observed in vivo effects should not be only recorded but they should be systematically correlated with the physicochemical and analytical properties of the individual dietary fibers The Division of Agricultural and Food Chemistry of the American Chemical Society has recognized this for some time and has asked us to organize another International Symposium similar to one in 1982 which would address the latest developments in this field We decided to ask a cross section of leading experts from industrial and academic research institutions to assess the state of the art in dietary fiber namely in the areas of the physiological effects physicochemical attributes and in existing and proposed analytical methods We also felt that chemistry and physical chemistry should play a greater role in fiber research to complement and better explain the existing in vivo data There is a large volume of animal and human physiological and nutritional data available Unfortunately the generated information is frequently confusing One reason is that this research is not conducted with well characterized compounds but rather with loosely defined complex mixtures or entities Recent Developments in Separation Science Norman N. Li,1972 Recent Developments in Microbial Technologies Ram Prasad,Vivek Kumar,Joginder Singh,Chandrama Prakash

Upadhyaya,2020-12-07 This book focuses on the application of microorganisms in various aspects of life such as plant protection and improvement environmental remediation and the improvement of plant human health Various applications of microorganisms are examined in depth e g applied microbiology in agriculture microbes in the environment the development of new microbial enzymes and microbes in human health In turn the book shares insights into the diverse microorganisms that have been explored and exploited in the development of various applications for agricultural improvements It also

discusses the detection and exploitation of microorganisms in the diagnosis of human diseases which offer potential holistic approaches to health Presenting the latest information and findings on the applications of microbial biotechnology the book offers a valuable resource

Recent Development in Energy Conversion Systems Sunday Olayinka Oyedepo, Fidelis Ibiang Abam, Olusegun David Samuel, Oluseyi Olanrewaju Ajayi, Abimbola Patricia Popoola, Diana-Andra

Borca-Tasciuc, 2024-03-15 In this industrial and technological age energy plays a principal role in sustainable development This is connected to issues regarding availability production processes utilization and environmental impact Due to the increased rate of population growth the energy demand in the entire world is getting to the level that it may not be sustained in the nearest future if drastic action is not taken to address the situation especially from research and development perspectives None of the millennium development goals MDGs can be completed without considerable improvements in the quality and quantity of energy services in developing countries according to the United Nations Development Programme UNDP Based on this fact UNDP is making efforts especially in developing countries to ensure that people have access to sustainable sources of clean reliable and affordable energy since every aspect of human development is highly impacted by this vital resource

Recent Development of Electrospinning for Drug Delivery Romána Zelkó, Dimitrios A. Lamprou, István Sebe, 2020-03-27 Several promising techniques have been developed to overcome the poor solubility and or membrane permeability properties of new drug candidates including different fiber formation methods Electrospinning is one of the most commonly used spinning techniques for fiber formation induced by the high voltage applied to the drug loaded solution With modifying the characteristics of the solution and the spinning parameters the functionality related properties of the formulated fibers can be finely tuned The fiber properties i e high specific surface area porosity and the possibility of controlling the crystalline amorphous phase transitions of the loaded drugs enable the improved rate and extent of solubility causing a rapid onset of absorption However the enhanced molecular mobility of the amorphous drugs embedded into the fibers is also responsible for their physical chemical instability This Special Issue will address new developments in the area of electrospun nanofibers for drug delivery and wound healing applications covering recent advantages and future directions in electrospun fiber formulations and scalability Moreover it serves to highlight and capture the contemporary progress in electrospinning techniques with particular attention to the industrial feasibility of developing pharmaceutical dosage forms All aspects of small molecule or biologics loaded fibrous dosage forms focusing on the processability structures and functions and stability issues are included

Recent Trends in Nanotechnology and Materials Science Ford Lumban Gaol, Jeffrey Webb, 2014-05-19 This book presents 8 selected reviews from the 2013 International Conference on Manufacturing

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Recent Advances in Applied Mechanics Tezeswi Tadepalli, Vijayabaskar Narayanamurthy, 2022-04-04 This book comprises

the proceedings of the Virtual Seminar on Applied Mechanics 2021 organized by the Indian Society for Applied Mechanics The contents of this volume focus on solid mechanics fluid mechanics biomechanics biomedical engineering materials science and design engineering The authors are experienced practitioners and the chapters encompass up to date research in the field of applied mechanics This book will appeal to researchers and scholars across the broad spectrum of engineering involving the application of mechanics in civil mechanical aerospace automobile bio medical material science and more

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Recent Trends in Applied Physics and Material Science Sudhir Bhardwaj,Manoj Singh Shekhawat,Bhuvneshwer Suthar,2025-10-22 It gives us immense pleasure to present the Conference Proceedings of the Second International Conference on Recent Trends in Applied Physics Material Science RAM 2024 held on November 15 16 2024 at Bikaner Rajasthan India This prestigious event was organized jointly by Bikaner Technical University Bikaner and the Condensed Matter Research Society Bikaner with the support of our esteemed publication partners CRC Press and the Journal of Condensed Matter RAM 2024 brought together over 400 participants both offline and online from across the globe reflecting the vibrant and growing international interest in the domains of Applied Physics and Material Science The conference featured plenary and keynote lectures by eminent experts oral presentations and poster sessions providing a stimulating platform for the exchange of knowledge and recent advances in the field

Handbook Of Nanobiomedical Research: Fundamentals, Applications And Recent Developments (In 4 Volumes) Vladimir P Torchilin,2014-08-18 This book consists of 4 volumes containing about 70 chapters covering all the major aspects of the growing area of nanomedicine Leading scientists from 15 countries cover all major areas of nanobiomedical research materials for nanomedicine application of nanomedicine in therapy of various diseases use of nanomedicines for diagnostic purposes technology of nanomedicines and new trends in nanobiomedical research This is the first detailed handbook specifically addressing various aspects of nanobiomedicine Readers are treated to cutting edge research and the newest data from leading researchers in this area

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