Green Energy and Technology

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Advanced Manufacturing in Biological, Petroleum, and Nanotechnology Processing

Application Tools for Design, Operation, Cost Management, and Environmental Remediation

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Advanced Manufacturing in Biological, Petroleum, and Nanotechnology Processing

Application Tools for Design, Operation, Cost Management, and Environmental Remediation

- Book
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Overview

Editors:

- Augustine O. Ayeni,
- Olagoke Oladokun,
- Oyinkepreye David Orodu

- Presents advanced methods for manufacturing industrial products
- Highlights new solutions for pollution and waste management
- Explores modeling and simulation of industrial and environmental processes

Part of the book series: Green Energy and Technology (GREEN)

About this book

This book covers advanced manufacturing in biological, petroleum, and nanotechnology processing for the development of novel products and systems that incorporate enhanced pollution control and waste management for environmental remediation. The book is divided into three parts. The first section looks at the design

and application of process systems, the second section focuses largely on pollution control and management, and the final section discusses areas related to process modeling and simulation. Coverage highlights the integration of smart tools and solutions and looks at current advances in monitoring industrial and environmental processes that can assist in making significant progress in process design for the effective control of pollution and waste management.

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- Biopolymers Production
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- Machining Operations
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Editors and Affiliations

- **Department of Chemical Engineering, Covenant University, Ota, Nigeria**
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About the editors

Dr. Augustine O. Ayeni is an Associate Professor of chemical engineering at Covenant University, where was head of the Department of Chemical Engineering from 2018-2021. He has more than 16 years of university teaching and research experience in Nigeria, India, and South Africa. His research specialization and interests include biochemical engineering, environmental engineering, corrosion control, chemical kinetics and reaction engineering, bioresource engineering, and energy/bioenergy engineering. Dr. Ayeni is a Registered Engineer (R.Eng) with the Council of Regulation of Engineering in Nigeria and a member of the Nigerian Society of Engineers and the South African Institute of Chemical Engineers. He has contributed substantially to the advancement of chemical engineering and applied sciences through the publications of over 80 peer—reviewed articles including books, book chapters, journal articles, and conference papers. He has supervised many undergraduate and postgraduate students research projects. He is the co-editor of the book *Valorization of Biomass to Value-Added Commodities: Current Trends, Challenges, and Future Prospects* (Springer, 2020). He is a frequent reviewer for many high-impact scientific journals and the National Research Foundation (NRF) of South Africa.

Dr. Olagoke Oladokun is a Senior Lecturer in the Department of Chemical Engineering at Covenant University. His research interests include empirical and

mathematical modeling and simulation and their application to chemical, energy, biological and social systems for optimization, automation, and control. Over time, his research has focused on green energy and cleaner fuel in the production of biohydrogen from lignocellulose waste using thermochemical conversion processes specifically pyrolysis, with a focus on multiphase mathematical modeling and simulation in computational fluid dynamics (CFD) optimal design and operation. While still searching for the future green fuel, Dr. Oladokun has worked with a team on the removal of CO2 from natural gas (NG). He has also led a team in the empirical instrumentation and mathematical modeling and optimization of the pressure swing adsorption (PSA) process for the removal of CO2. He has also worked on projects involving modeling of bubble formation during acoustic cavitation and the application as a process intensifier in the separation of azeotrope mixture and energy source from the bubble collapse. He has a future interest in real-time systems and dynamic study using the Internet of Things (IoT), remote sensing process through sensors, and drone surveillance using C, C++, and Python for real-time machine learning and optimization application for a cleaner environment, public health, agricultural farms, high-risk chemical plants, and crowd control and security.
Professor Oyinkepreye D. Orodu is a Professor in the Department of Petroleum Engineering at Covenant University and has variedoil and gas industry experience spanning field operations and academia. He holds a bachelor's degree in chemical engineering from the University of Port Harcourt, a master's in oil and gas engineering from Robert Gordon University, and a doctorate in oil and natural gas engineering from the China University of Geosciences. He has undertaken reservoir studies of oil fields in East Asia and is actively engaged in the World Bank’s Africa Center of Excellence in Oilfield Chemicals Research (ACE-CEFOR) at the University of Port Harcourt. His core competence areas are petroleum reservoir engineering and characterization, reservoir fluid characterization, and energy economics. Professor Orodu has authored and co-authored over 70 articles and is a reviewer for high-impact international journals. He is an active researcher and heads a research cluster on petroleum reservoir and production technology. He is a member of the Society of Petroleum Engineers (SPE) and the American Association of Petroleum Geologists (AAPG), and a registered engineer (R.Eng., COREN) in Nigeria.

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