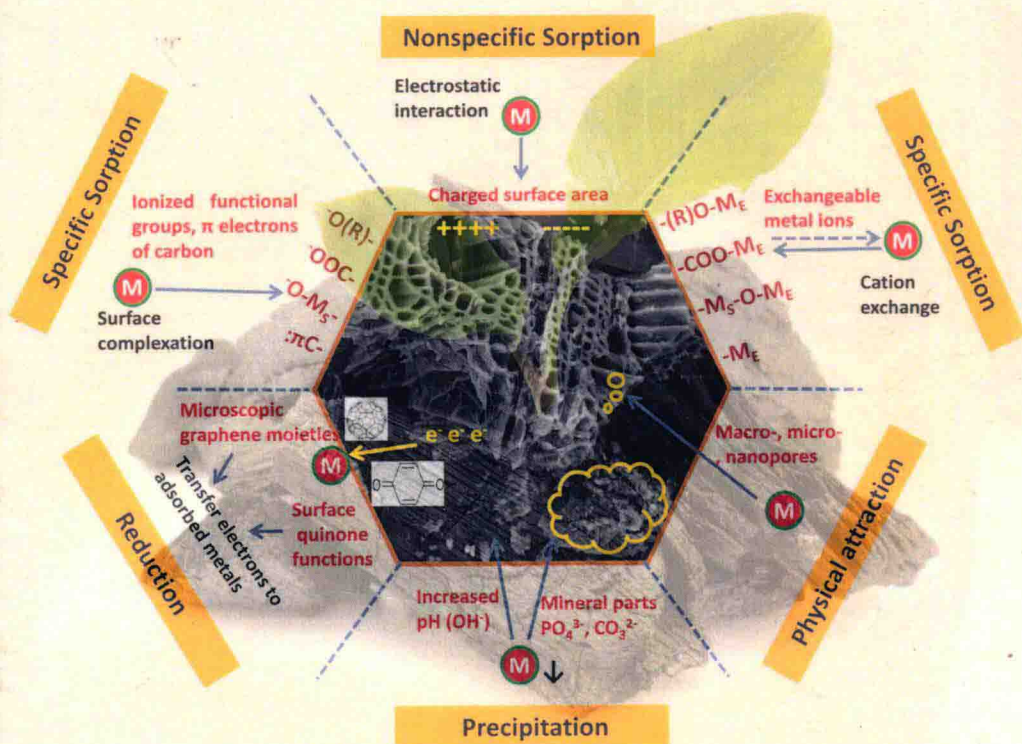


Biochar

Production, Characterization, and Applications



Edited by
Yong Sik Ok • Sophie M. Uchimiya
Scott X. Chang • Nanthi Bolan

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Series Editor

Ming Hung Wong

Biochar: Production, Characterization, and Applications, *edited by Yong Sik Ok,
Sophie M. Uchimiya, Scott X. Chang, Nanthi Bolan*

Preface

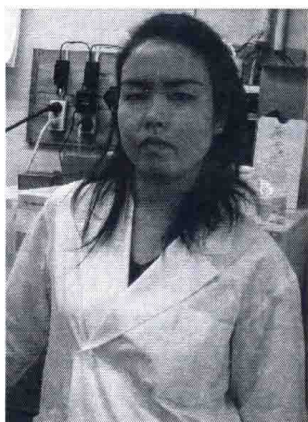
Biochar is receiving worldwide interest because of its potential beneficial applications in bioenergy production, global warming mitigation, and sustainable agriculture. Unfortunately, many of the published biochar books are not suitable for use as textbooks in undergraduate and graduate courses. To help meet this need, this book provides the fundamentals of biochar, such as its concept, production technology, and characterization methods, with comprehensive examples for readers. Building on these fundamentals, this book provides examples of state-of-the-art biochar application technology in agronomy and environmental sciences, with detailed case studies. This book is designed as a textbook for graduate courses and as a handbook for practitioners and policy makers. *Biochar: Production, Characterization, and Applications* is written by internationally renowned scientists with different backgrounds.

Editors



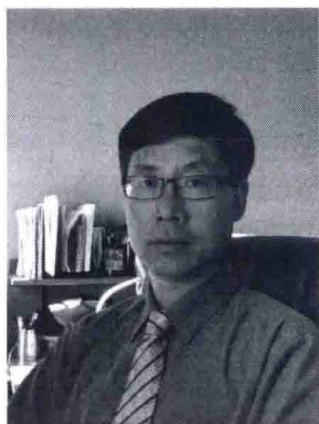
Dr. Yong Sik Ok is a professor in the Department of Biological Environment, Kangwon National University (KNU), Chuncheon, Republic of Korea, and is currently serving as the director of the Korea Biochar Research Center in Korea. Dr. Ok has supervised more than 50 postgraduate students, post-doctoral fellows, and visiting scientists from many countries, including Korea, China, Saudi Arabia, Egypt, India, Pakistan, and Sri Lanka. In addition, he

has published more than 250 peer-reviewed articles and received the KNU Excellent Research Award in recognition of his outstanding achievements. He is currently serving as an editor for *Environmental Geochemistry and Health* (coordinating editor), *Journal of Soils and Sediment* (subject editor), and *Canadian Journal of Soil Science* (associate editor). He has also served as a guest editor for *Bioresource Technology*, *Journal of Hazardous Materials*, *Chemosphere*, *Plant and Soil*, *Environmental Science and Pollution Research*, and *Journal of Soils and Sediments*. Other notable engagements include working as a visiting professor at the Department of Renewable Resources, University of Alberta, Edmonton, Canada; Faculty of Bioscience Engineering, Ghent University, Belgium; and Department of Civil and Environmental Engineering, Hong Kong Polytechnic University, Hong Kong. As a top researcher in his field, Dr. Ok has organized many international conferences, including, most recently, CLEAR 2014 (Korea) and Biological Waste 2014 (Hong Kong).



Dr. Sophie M. Uchimiya earned a BS in chemistry from the University of Oregon, Eugene, Oregon, in 2000, and a PhD in environmental chemistry from Johns Hopkins University, Baltimore, Maryland, in 2005. She is currently a research chemist at the U.S. Department of Agriculture-Agricultural Research Service (USDA-ARS) Southern Regional Research Center in New Orleans, Louisiana.

Dr. Uchimiya holds an adjunct professorship at the Department of Material Science and Engineering, SUNY Stony Brook, and is an associate editor of *Journal of Environmental Quality*. Dr. Uchimiya has 16 years of research experience in sorption-desorption kinetics/isotherms on biosorbents, redox and other abiotic/biotic transformation reactions in soil, thermochemical conversion of agricultural wastes, contaminant fate and transport, and environmental forensics. Dr. Uchimiya's expertise in environmental chemistry realized bottom-up development of agricultural waste-derived, value-added products by elucidating chemical speciation at surface-water interfaces that will lead to desirable functions. This mechanistic approach was necessary to gain fundamental material property-function relationships in soil and other complex media where sorption, chemical transformation, and physical transport occur concurrently. Dr. Uchimiya collaborates extensively with academia and the federal sectors to utilize high-resolution spectro- and microscopic techniques such as three-dimensional synchrotron X-ray computed microtomography (Brookhaven National Laboratory, New York) and solid-state nuclear magnetic resonance (National Institute for Agro-Environmental Sciences, Japan). During her tenure at the ARS, Dr. Uchimiya brought in several reimbursable projects funded by the USDA/National Institute of Food and Agriculture/Agriculture and Food Research Initiative, Department of Defense (DoD) Strategic Environmental Research and Development Program, and DoD Defense Threat Reduction Agency.



Dr. Scott X. Chang is a professor in forest soils and nutrient dynamics at the University of Alberta, Edmonton, Canada. He has served as the chair of the Forest, Range, and Wildland Soils Division of the Soil Science Society of America, chair of the Soil Fertility and Plant Nutrition Commission of the International Union of Soil Science, and chair of the Alberta Soil Science Workshop. His research interests include soil biogeochemistry, climate

change, forest productivity, agroforestry, and land reclamation. Dr. Chang has supervised more than 80 postgraduate students, postdoctoral fellows, and visiting scientists from many countries, including Canada, the United States, New Zealand, China, the Republic of Korea, Japan, Pakistan, India, Sri Lanka, the Philippines, Nepal, Iran, Kenya, Ghana, Cameroon, Ethiopia, Libya, Brazil, and France. He has published more than 170 peer-reviewed articles and was awarded the University of Alberta Annual Killam Professorship. Dr. Chang has served as an associate editor for the *Canadian Journal of Soil Science*, as an editorial board member for *Communications in Soil Science and Plant Analysis*, and as a guest editor for the *Canadian Journal of Soil Science*, *Forest Ecology and Management*, *Journal of Soils and Sediments*, and *Journal of Environmental Quality*. He is currently serving as the special issues editor for the *Canadian Journal of Soil Science*, as an editorial board member for *Biology and Fertility of Soils* and *Pedosphere*, and as an associate editor for *Journal of Soils and Sediments*. He has reviewed grant applications for the Natural Science and Engineering Research Council of Canada, Natural Environment Research Council (UK), European Union's 6 Framework Programme for Research, the Netherlands Organization for Scientific Research, the German Federal Ministry for Education and Research, the Biotechnology and Biological Sciences Research Council (UK), National Science Foundation, Georgian National Science Foundation, Agriculture and Agri-Food Canada, and British Columbia Forest Science Program grants.



Dr. Nanthi Bolan is professor of Environmental Science at the University of Newcastle, Australia. He has served as the dean of Graduate Studies of the University of South Australia and also as the leader of the Cooperative Research Centre Contaminant Assessment and Remediation of the Environment Programme on Prevention Technologies. His teaching and research interests include agronomic value of manures, fertilizers, and soil amendments; soil acidification; nutrient cycling; pesticide and metal pollutants interactions in soils; soil remediation; and waste and wastewater management. Dr. Bolan is a fellow of the American Soil Science Society and New Zealand Soil Science Society and was awarded the Communicator of the Year award by the New Zealand Institute of Agricultural Sciences. He has supervised more than 40 postgraduate students from many countries, including Australia, New Zealand, India, Indonesia, Thailand, Malaysia, Bangladesh, Brazil, France, the Netherlands, Sri Lanka, and the Philippines, and he was awarded the Massey University Research Medal for excellence in supervision. Dr. Bolan has published more than 200 papers and was awarded the M.L. Leamy Award in recognition of the most meritorious contribution to soil science. Dr. Bolan has served on the editorial board of two international journals, *Nutrient Cycling in Agroecosystem* and *Environmental Geology and Health*, and is currently serving as an associate editor of the *Journal of Environmental Quality* and *Critical Reviews in Environmental Science and Technology*.

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