Energy and environment - An introduction

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This special issue covers important research themes related to pollution control and resource recovery in water, air, and soil/solid environments. With the advent of new technologies and innovations in the field of applied sciences, waste treatment has been combined with resource recovery, e.g., biogas, bio-fuel, water for reuse, biochemicals, and fertilizers. Microorganisms are ubiquitous in the biosphere. The most significant importance of the microbes on earth is their roles to recycle the elements involving biogeochemical cycles (carbon, nitrogen, sulfur, phosphorus, silicon, and metals). For example, based on the microbial metabolism of respiration and fermentation, several organic compounds can be broken into smaller molecule such as carbon dioxide (CO₂). On the other hand, the release of H₂S gas from hot springs, crude petroleum, volcanic gases, refineries, sewage treatment industries, and paper mills has also shown to cause significant human health and environmental hazards. For the treatment of odors (e.g., H₂S and NH₃) and volatile organic compounds (VOCs such as benzene and toluene), various approaches have been developed based on physical, chemical, and biological processes. Biological processes to remove pollutants present in gas and liquid phases have been suggested as a suitable strategy because it has demonstrated to be energy

efficient, cost-effective, and yield high removal of the pollutant, under both steady and transient operating conditions.

Nowadays, the current linear production, consumption, and disposal models are no longer adequate due to the ineffective production and use of energy resources. Besides, the world's energy production and consumption pattern are not eco-friendly and environmentally sustainable. To reduce the use of fossil fuels, mitigate the associated climate effects, and minimize the impacts associated with landfilling, the waste sector, as well as all other renewable energy resources, must be employed. Waste and energy management sectors can play an essential role in facilitating a circular bioeconomy. Besides, energy recovery from waste can also be a part of this industrial symbiosis networks. Thus, an improvement of integrated waste management contributes to enhanced economic and environmental efficiencies in well-known processes such as anaerobic digestion of liquid and solid wastes.

In developing countries, waste-to-energy technologies are getting more attention from different stakeholders because of their potential to reduce landfilling and greenhouse gas emission. However, the low calorific value of waste due to its high-water content becomes a challenge for economic and environmental effectiveness of energy recovery practices. Also, combining technologies by considering the geographical characteristics, future

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trends of waste generation, source separation/on-site treatment, and incinerator can efficiently recover energy from municipal solid wastes (MSWs). The collection of papers presented in this special issue covers appropriate technologies that consider local conditions and promote energy recovery and circular economy in the region. Characteristics and circular economy play a significant role in effective energy recovery and environmental management. This special issue will provide valuable networking opportunity and set the stage for further cooperation among professionals from many Asian countries. The guest editors of this EEM-2019 special issue are thankful to the Editor-in-Chief of Environmental Science and Pollution Control (ESPR), Prof. Philippe Garrigues, for providing an opportunity to publish selected peer-reviewed papers that were presented at the following international/national conferences: (i) International Forum on Green Technology and Management (IFGTM-2019), an annual international event initiated by the Consortium for Green Technology Management and Research (CGTMR), Vietnam; (ii) The First International Conference on Biotechnology, Bioengineering, Biorefinery and Pollution Prevention (BBBP 2019) held at Chulalongkorn University, Thailand; and (iii) National Symposium on Environmental Pollution Prevention and Control: Future Perspective (EPPC:FP-2019), conducted by NITK Surathkal, India. Our special thanks to Ms. Fanny Creusot and Ms. Florence Delavaud, Editorial Assistants of ESPR, and the entire production team at Springer for their valuable support in bringing out this issue successfully. The guest editors firmly believe that the special issue papers will be a useful reading document to your research group, and we wish you all the very best.

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Minh Giang Hoang is an Assistant Professor at the National University of Civil Engineering (NUCE), Vietnam. Dr. Giang received a B. Eng in Environmental Engineering from NUCE in 2006, an MSc (2010) in Environmental Engineering from Politecnico di Milano, Italy, and a PhD (2017) in Environmental Science from Okayama University, Japan. Currently, he teaches undergraduate/graduate courses of solid waste management and environmental data

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Dr. Wannapawn Watsuntorn is a postdoctoral researcher from Chulalongkorn University, Thailand. Dr. Watsuntorn completed her Bachelor's degree in Genetics in 2012 and a PhD in Biotechnology in 2017 from Chulalongkorn University, Thailand. Her PhD research focused on the removal of hydrogen sulfide using pure culture of *Paracoccus versutus* strain MAL1HM19, nitrate-reducing, sulfide oxidizing bacteria (NR-SOB) isolated from hot spring,

in anoxic bioreactors. Her current work mainly focuses on the isolation of oleaginous yeasts from natural and industrial sources of Thailand and enhancement of their lipid production.

Prof. Dr. Warawut Chulalaksananukul completed his bachelor and master degrees from Chulalongkorn University, between 1977 and 1983. After graduation, he became one of the staff members of the Department of Botany, Faculty of Science, Chulalongkorn University. After 3 years of work, he got the fellowship from the French government to further his study in the fields of Microbiology and Biotechnology in France. He got another master diploma in 1989 and was awarded

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