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EDITORIAL

Water environment and recent advances in pollution control technologies

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Initiation of this special issue

This special issue (SI) of *Environmental Science and Pollution Research* (ESPR) entitled "Water Environment and Recent Advances in Pollution Control Technologies" collected the best papers that were formally presented at "The 6th International Conference on Water Resource and Environment (WRE2020)" from August 23rd to 26th, 2020. The WRE2020 conference was a great success with 137 participants from 27 countries; three keynote speeches delivered by Prof. Jun Xia, Prof. Zhongbo Yu, and Prof. Chih-Huang Weng; 53 oral presentation papers; and 9 poster presentation papers. The conference themes covered various aspects of water environment, environmental science, and pollution control technologies, including, but not limited to, water resources, water quality, pollution control, groundwater issues, water and wastewater treatment technologies, wetland system, climate changes adaptation and mitigation strategies, ecological environments, waste utilization, and flood risk management and impact assessment.

The WRE conference aims to provide a forum for scientific professionals and specialists to exchange the up-to-date knowledge relating to water resources and environmental issues, specifically focusing on understanding the issue of indispensable water resources in achieving a sustainable manner and targeting advanced vital technologies to protect the fragile water environments under the growing concern of intensive water usage that we are facing today (Weng 2020). Due to the outbreak of the COVID-19 pandemic, the WRE 2020 stopped being held in Tokyo as initially scheduled and transitioned online via virtual presentations. The WRE conference debuted in 2015 when the first WRE was launched in Beijing with more than one hundred participants. As an annually held conference, this conference has been successfully held in Shanghai, Qingdao, Kaohsiung, and Macau in the past years. The upcoming 7th WRE conference is prescheduled held in Xi'an, China, from November 1st to 4th, 2021; however, because of the continued influence of the current pandemic worldwide, WRE2021 will be launched in online mode via Microsoft Teams (http://www.wreconf.org).

The present SI of ESPR was guest-edited by Professor Chih-Huang Weng from I-Shou University, Kaohsiung, Taiwan. The papers were selected based on a rigorous process of unbiased peer-review by at least two reviewers. The present issue contains a detailed review article on persistent organic pollutants removal and articles relating to water quality, water treatment technologies, pollution control, waste utilization, and ecosystem protection.

Key findings of selected papers

A brief statement of the importance and the key findings of the papers included in this SI are outlined as follows:

- Membrane technology in conjunction with photocatalysis has been proven to have synergistic effects in combating wastewater containing various emerging organic pollutants. The immense potential of employing a hybrid photocatalytic membrane in treating persistent organic pollutants (POP) is because it can overcome the limitation of both membrane and photocatalysis technology encountered as applied individuals while keeping satisfactory removal efficiency. An excellent review highlighted the recent development of POP removal by photocatalytic membranes was performed by Subramaniam et al. (2021). They provided an in-depth review of both the role of photocatalysis and membrane in treat-

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ing POP using a hybrid photocatalytic membrane. The fundamental of photocatalytic mechanism, the design of photocatalyst, and POP that can be treated by photocatalysis were included in this review. They also discussed the development of different configurations of fabrication and performance evaluation of photocatalytic membranes technology. By separating and destroying various types of POPs simultaneously, the hybrid photocatalytic membranes have significant potential in treating real wastewater at an industrial scale. Thus, they pointed out the challenges and future research direction in the field of hybrid photocatalytic membranes.

- Combustion of liquid fuel (gasoline and diesel) containing organosulfur compounds (OSCs) could release noxious sulfur oxides and result in detrimental effects to public health. Feliciano et al. (2021) demonstrated that organo-sulfur compounds could be recovered from saturated neutral activated alumina via eluents, including acetone, ethanol, and the mixture of acetone and ethanol. Based on the thermodynamics and kinetics studies, Feliciano et al. concluded that acetone is more favorable for OSC desorption. The recovery efficiency is higher than that of ethanol due mainly to higher molar polarization and dipole moment. However, the recovery yield of OSCs did not improve significantly by the mixture of acetone and alcohol. They also indicated that the spent neutral activated alumina is reusable and remains effective in adsorption sulfur, with a regeneration efficiency of 93% attained after the 2nd cycle.
- Houjing River, a well-known river located in northern Kaohsiung, Taiwan, flows through four major heavily industrialized zones, i.e., Dashe Industrial Park, Renwu Industrial Pard, Kaohsiung Oil Refinery, and Nanzih Processing Zone. These parks house highly polluted processing manufactories, such as chemical processing, metal surface processing, oil refinery, semiconductor packaging, and plastics. In the past, several pollution incidences of Houjing River have dragged public attention and have raised concerns. To develop comprehensive and sound policies for sustainable management of this river, Yeh et al. (2021) showed the spatial and temporal trend of water quality and heavy metals of Houjing River based on a five-year sampling investigation. Although the dissolved oxygen has improved recently, the electrical conductivity remains high, which is not permitted for irrigation. They found that the spatial trend of the total heavy metal mass flux is in conjunction with metal-related industries' location and increased gradually from upstream to downstream.
- Because of the extensive use of Ni-containing plumbing materials, the leaching of Ni into the drinking water distribution systems is expected to increase over time, posing a long-term exposure risk to users. In Taiwan, stainless-steel pipes are the primary plumbing material used in drinking water supplies. Adhikari et al. (2021) assessed the levels of Ni contamination in drinking water samples collected from dispensers of 58 elementary schools in Taichung, Taiwan. They indicated that drinking water is the potential source of Ni, and the extent of Ni contamination varied with the size and age of the school. The schools with student populations of over 500 with age over 50 years were more likely to exhibit Ni levels exceeding the Taiwan Environmental Protection Administration (EPA) standard value (20 μg/L). Moreover, summer and weekend samples showed a higher tendency to exceed the regulatory standard.
- The fast-economic development of the Yangtze River Economic Belt (YREB) in China resulted in an impact on the ecosystem and increased awareness of environmental problems. Research on studying the ecosystem service mechanism in YREB is needed. Based on a study of 5-years data of the development of the ecosystem environment in the YREB, Li et al. (2021) showed that the spatial distribution of the studied five ecological services in YREM was different, while the spatial changes of the ecological services did not alter much. By accounting for three constraints, i.e., land category, watershed, and landscape, in the analysis of YREB paired ecological services from 2015 to 2020, they indicated that the type of service constraints was diverse and could be affected by the climate, terrain, and gross domestic product. Also, the scale of water supply, soil retention, and net primary productivity in this region was governed by meteorological factors.
- Waste utilization is one of the goals of the circular economy. Municipal incinerator bottom ash (MIBA) is the residue derived from incinerating municipal solid wastes, which is reusable and can be fitted in the circular economy scheme. The idea of MIBA utilization as construction materials can also be considered a win–win strategy because it alleviates the impact of landfill disposal and turns the MIBA into a valuable product. Although extensive works have been done on using MIBA as an additive for making ceramic products, the quality of tile products remains unstable. The critical point is that bending strength, water absorption, and linear shrinkage of such tile produced are very sensitive to the sintering temperature and the replacement level of MIBA. Lin et al. (2021) tested the MIBA samples from a municipal waste incineration plant, Taichung City, Taiwan, to evaluate the interactions between MIBA replacement level and various operative conditions in making ceramic floor tiles. Based on the results of nuclear magnetic resonance spectroscopy (NMR), Lin et al. revealed that less amount of Si in MIBA than clay leads to a decrease in bend-

ing strength. They concluded that up to 20% of MIBA in replacing kaolinite at kiln temperature 1050 °C or 1100 °C resulted in quality tiles that met with CNS (Chinese National Standard) standards of interior and exterior flooring applications.

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Declarations

Conflict of interest The author declares no competing interests.

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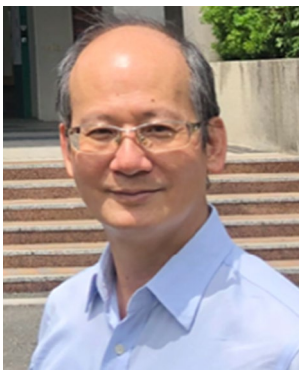

Professor Chih-Huang Weng is the Chairman of the Department of Civil Engineering at I-Shou University, Taiwan. He also served as vice-president of North Kaohsiung Community University, Taiwan. He received his MS and Ph.D. degrees in 1990 and 1994, respectively, from the Department of Civil Engineering of The University of Delaware, USA. He has published over 100 journal articles with 6720 citations, 41 h-index, and 76 i10-index in the google scholar database. Based on the 2020 updated science-wide author databases of standardized citation indicators (https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3000918), his publication citation was listed on the top 1% and ranked at 263rd among 42,482 authors in the category of Engineering, Environmental. He has earned many awards and honors, including the National Innovation Award by the Research Center for Biotechnology and Medicine Policy, Taiwan. He is serving as the Associate Editor of *Environmental Geochemistry and Health* (Springer, since 2020) and on the Editorial Board Panel Member of *Coloration Technology* (Wiley, since 2013). He has also served as a Guest Editor of SCI journals, such as *Agricultural Water Management* (Vol. 174, Aug. 2016, Elsevier (https://doi.org/10.1016/j.agwat.2016.06.012)) and *Environmental Science and Pollution Research* (Vol. 26, issue 30, Oct. 2019 (https://doi.org/10.1007/s11356-019-06281-w); Vol. 27, issue 31, Oct. 2020 (https://doi.org/10.1007/s11356-020-09994-5), V.28, issue 34, Sep. 2021 (https://doi.org/10.1007/s11356-021-15004-z), Springer). He has also organized and chaired several international conferences. His main research interests focus on using advanced oxidation processes and adsorption to treat wastewater and bacteria inactivation, groundwater modeling, and application of electrokinetic technologies to soil remediation/sludge treatment/activated carbon regeneration.