國立陽明交通大學應用數學系
學術演講公告

主講人：莊易學 教授（陽明交通大學 環工所）

講　題：Development of novel UV-based advanced oxidation processes for water treatments

時　間：110 年 12 月 21 日(星期二) 下午 2:00 –3:00

地　點：(光復校區) 科學一館 223 室

Abstract

In this seminar talk, Dr. Chuang will be sharing his research on the developments of novel photochemical advanced oxidation processes that he has done previously and has been doing. Dr. Chuang's research focused on wastewater potable reuse, driven by the severe water scarcity in California, when he was a postdoc researcher. The severe water scarcity issues facilitate the use of highly treated domestic wastewater as an alternative source for drinking water in many states of the U.S. Full Advanced Treatment (FAT) trains consisting of microfiltration, reverse osmosis, and ultraviolet/hydrogen peroxide advanced oxidation process (UV/H2O2 AOP) are commonly employed for treating wastewater for potable reuse. Among these treatment units, the UV/H2O2 AOP represents a broad-screen chemical barrier by producing hydroxyl radical to destroy contaminants passing through RO. Moreover, utilities commonly add chloramines to control membrane fouling, and chloramines tend to pass through RO unit and appear in the RO permeate, making the subsequent UV/H2O2 AOP de facto UV/H2O2 + chloramines AOP. Dr. Chuang's work revealed that the presence of chloramines impaired the efficiency of AOP in terms of micropollutant degradation rates. To address this issue, Dr. Chuang's previous work also sought to find alternative oxidants or alternative AOP schemes that could outperform the current status quo. Inspired by his previous research, Dr. Chuang has kicked off research projects of using LED-UVA coupled with different oxidants to improve the efficacy of AOPs on degrading micropollutants after he started his assistant professorship in NYCU. Dr. Chuang's group successfully developed a mathematical kinetics model encompassing nearly 100 elementary reactions. In his talk, Dr. Chuang is going to show the audiences how a mathematical kinetics model can help engineers to optimize their designs.

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