

UNIVERSITY OF MACAU  
FACULTY OF SCIENCE AND TECHNOLOGY  
DEPARTMENT of  
CIVIL AND ENVIRONMENTAL ENGINEERING

Ref: FST/SEM/00052/2018

**" Polymer-based Nanocomposite for Scale-up  
Water Remediation "**

by

***Prof. Bingcai PAN***

Deputy Dean and Professor, School of Environment,  
Nanjing University, Nanjing, China

**Date: 28/08/2018 (TUESDAY)**

**Time: 3:00PM – 4:00PM**

**Venue: E11 – 1009**

## Abstract

Nanomaterials exhibit promising performance in water decontamination via adsorption, catalytic degradation, and other processes. However, the ultrafine particle size also brings issues including excessive pressure drop in flow-through systems and environmental risk arising from nanoparticle release. To overcome the bottleneck of most nanomaterials in full-scale manipulation, a series of millimetre-sized nanocomposites have been developed via in situ formation of nanoparticles (e.g. metal oxides/hydroxides/phosphates) confined in the pore channels of ion exchanger hosts. Such nanocomposites are suitable for application in fixed-bed reactors owing to their tunable size (0.6-1.0 mm) and excellent hydrodynamic properties. The confinement effect induced by the network pore structure of the cross-linked hosts tend to maintain the nanoscale nature of the embedded nanoparticles. Furthermore, the non-diffusible charges fixated on the host skeleton enhance the permeation of ionic pollutants inside the pore channels. Thus, the polymer-supported nanocomposites have demonstrated favorable adsorption of ionic pollutants such as Pd(II), Cd(II), Cu(II), As(V), F<sup>-</sup>, P(V), and have been successfully applied in full-scale advanced water treatments. Recently, novel millimeter-sized nanocomposites of inorganic skeleton (e.g. Ce-Ti-Zr ternary oxide) have been developed for catalytic oxidation processes, and have showed satisfactory performance in mineralization of recalcitrant pollutants such as oxalic acid.

## Biography

Prof. Pan obtained his PhD degree from Nanjing University (Environmental Engineering) in 2003. He is currently deputy dean for School of Environment, deputy director for State Key Laboratory of Pollution Control and Resource Reuse, deputy director for National Engineering Center of Organic Pollution Control and Resource Reuse, and chair for Department of Environmental Engineering. He has been awarded Distinguished Changjiang Scholar, 2015 National Technological Invention Award (2nd Prize), 2014 Technological Invention Award By Ministry of Education (1st Prize), 2013 Chinese Universities Tech-Invention Award (1st Prize), 2012 Young Scientist Award of Jiangsu Province, China, 2010 Prosper.net-Scopus Young Researcher Award, 2008 Asian Young Researcher Award (Conferred by Conference of Asian University Presidents). He is currently serving as Associate Editor, Chemical Engineering Journal (Elsevier); Editor, Environmental Science and Pollution Research (Springer); Editor, Frontiers of Environmental Science and Engineering (Springer); and Associate Editor-in Chief, Journal of Zhejiang University Science-A (Springer).

He has published many papers on high impact factored journals including Chemical Engineering Journal, Chemosphere, Water Research, Environmental Science and Technology, Scientific Reports, Journal of Hazardous Materials, Bioresource Technology, Science of the Total Environment, and Separation and Purification Technology.

*ALL ARE WELCOME!*