Technical Seminar

Breakthrough on Nanofiber Technologies to Air Purification and Solar Cells

Date : 25th April 2018 (Wednesday)
Time : 19:00 – 20:30
Venue : Lecture room N001, The Hong Kong Polytechnic University

Programme Highlight

In this seminar, we will discuss applications of novel nanofiber technologies in addressing clean energy demand and combating air pollution that threatens the environment.

The large magnitude of the solar energy available can be many folds that of our annual global energy demand. Unfortunately, the high cost and low efficiency of photovoltaics (PV) render the PV technology from being considered as the popular choice. An environmental friendly promising PV technology is the dye sensitized solar cell (DSSC) that uses an organic dye to effectively harvest solar energy and convert efficiently photons to electrical charges. Three technologies on nanofiber-based DSSC will be discussed.

Along the environmental front, pollutants in form of gaseous and particulate pollutants have been responsible for smog and chronic health problems. Filtration using nanofibers arranged in novel configurations can remove particulate pollutants and air borne viruses as small as 10-100 nm with high efficiency, high capacity, low-pressure drop and stable performance. These nanofiber technologies present enormous applications, from face mask, respirators, cabin filter, HVAC, engine, turbine, clean room, hospital wards to industrial uses. Besides, novel nanofiber photocatalysts, which are made of composite semiconductor, can purify air/gases effectively by breaking down harmful gases to carbon dioxide and water vapor, after harvesting both UV and visible light. They are extremely effective in killing bacteria through oxidation of their cell walls.

Co-organizers:

HKIE THE HONG KONG INSTITUTION OF ENGINEERS 香港工程師學會
Gas and Energy Division
Materials Division
Mechanical, Marine, Naval Architecture & Chemical Division

IET The Institution of Engineering and Technology
IET Hong Kong

THE HONG KONG POLYTECHNIC UNIVERSITY 香港理工大學
DEPARTMENT OF MECHANICAL ENGINEERING 機械工程學系

Speaker's Bio

Ir Prof. Wallace Leung joined the Mechanical Engineering department of the Hong Kong Polytechnic University (HKPolyU) as Chair Professor of Innovative Products & Technologies in 2005. Between 2005 and 2010, he was the founding Director of Research Institute of Innovative Products & Technologies, HKPolyU, devoting to research and development of healthcare technologies in collaboration with the 26 departments in HKPolyU, hospitals, health professionals, and medical device companies adopting a multidisciplinary approach. Prof. Leung is an innovator, inventor and multidisciplinary engineer with expertise covering mechanical, chemical, material, petroleum, aerospace, mineral processing, biotechnology, and healthcare technologies. His specialty and current research interest are biotech separations and nanofiber technologies as applied to nano-aerosol filtration, dye sensitized solar cells, perovskite solar cells, photocatalysis, tissue scaffolding, engine cooling, rotating microfluidics, and centrifugal separation. He has invented many technology platforms in the above sectors having 48 issued United States patents and 80 scientific papers published to his credit. In Mechanical Engineering department at HKPolyU, Prof. Leung is the thermal-fluid teaching group leader. His current teaching responsibility encompasses courses on aerodynamics, air pollution control, air conditioning for indoor air quality and comfort, fluids engineering, and heat and mass transfer courses.

Prior to joining HKPolyU, he has been working in the US industry for 25 years with Water Purification Associates, Gulf Oil R&D Company, Schlumberger, Baker-Hughes/Bird, and Advantech Engineering (founded by Prof. Leung), respectively. Prof. Leung received BSc in Mechanical & Aerospace Engineering from Cornell University, SMME and ScD both in Mechanical Engineering from MIT. He is a Fellow of Hong Kong Institute of Engineers, Hong Kong Academy of Engineering Sciences, American Society of Mechanical Engineers, American Institute of Chemical Engineers, and American Society of Filtration and Separations. He is presently Chairman of an international association with 13 member countries on filtration and separation responsible for promoting the activities and organizing the next World Filtration Congress (held every 4 years) in April 2020 in San Diego, USA.