The Chinese University of Hong Kong

Department of Biomedical Engineering

Graduate Seminar – PhD Oral Defence

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Date	:	9 November 2018 (Friday)
Time	:	4:00 p.m.
Venue	:	Room 702C William MW Mong Engineering Building (ERB)

Title: Spore-derived Nanomaterials and Hybrid Microdevices for Biosensing and Environmental Remediation

Micro/nanomaterials and their derived microdevices have aroused much interest and shown great promising in biomedical and environmental applications due to outstanding properties from scaling-down effect. To achieve high-efficient chemo-/bio-analysis and removal in these applications, there have be several critical issues to be considered adequately, including architectural design, mass production, proper functionalization, optimal synergy and active ability. Intricate and unique micro/nanomaterials in nature may provide promising solutions to these problems because of amazing evolved components and functions responding to the gradually changing environment. Inspired by the biological materials with abundant components, porous and peculiar structures and functionalities, this thesis will focus on presenting the nanomaterials and hybrid microdevices derived from fungi spores, which contain rich biogenic elements for medicinal values and possess a peculiar morphology with negative potential for rapid diffusion and high-capacity adsorption.

Spore-derived nanomaterials, multi-doped carbon dots, are firstly produced via a facile hydrothermal treatment of fungi spores, which can serve as multifunctional agents for clinical theranostics. Inspired by their structure, fluorescent magnetic spore-based microrobots are synthesized by the functionalization of magnetic spores for the detection of Clostridium difficile toxins in bacteria supernatants and clinical stool samples. Meanwhile, porous biohybrid absorbent microrobots are prepared by making magnetic spore with multi-scaled pores and high-adsorption components via a facile hydrothermal treatment of spores for effective and recycled removal of multiple heavy metal ions. With such developments and innovations, spore-derived nanomaterials and microdevices are expected to have tremendous effect on sensing and environmental remediation. These studies will offer a common and controllable fashion to obtain desired micro/nanomaterials and derived devices using extensive biological materials.

***** ALL ARE WELCOME *****

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