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## Interfacial assembly and theranostic applications of organic-inorganic hybrid nanomaterials

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Nanotheranostic materials have been recently involved the use of nanoparticles for simultaneous diagnostic and therapeutic purposes. New materials have been extensively developed towards drug delivery and tumor imaging. In the first part of the presentation, the synthesis, characterization, and properties of theranostic nanoparticles based on organic-inorganic hybrid nano-particles will be described. The hybrid nanoparticle consists of a superparamagnetic iron oxide core and a series of coatings which are stimuli-responsive supramolecules or polymers. By the concept of nanovalve based on supra-molecular gate-keepers, stimuli-responsive drug delivery nanosystem was synthesized by (i) modified solvothermal reaction; (ii) sol-gel reaction; and (iii) coupling reaction of supramolecules. In these systems, the "ON/OFF" switching of the gatekeeper supramolecules can be controlled by pH-sensitive intramolecular hydrogen bonding or electrostatic interaction (such as metal chelating). Biological evaluation of the nanoparticles renders them non-cytotoxic and can be uptaken by several cell types. The anti-tumor drug (doxorubicin) loading and release profiles which were studied by the UV/visible absorption spectroscopy, were demonstrated by using ultrasonic wave. Magnetic resonance imaging analysis of the particles reveals a high relaxivity, rendering them useful nanotheranostic agents. Another part of the presentation will focus on design, synthesis, purification, and property-exploration of mono-functionalized gold nanoparticles.

### Biography

Ken Cham-Fai Leung has completed his BSc and PhD degrees at The Chinese University of Hong Kong and did his Postdoctoral work with Sir J. Fraser Stoddart at UCLA. He has published more than 70 papers in reputed journals and has a H-index of 32.

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