



The Chinese University of Hong Kong
Department of Biomedical Engineering



Time: 10:00am, 12 Dec (Mon) Venue: ERB215 and on Zoom

Seminar Link:

<https://cuhk.zoom.us/j/99268942518?pwd=UXNJbVArUFlwQW9xRkVGTnFrQjdNUT09>

Topic: Ultra-sensitive Plasmonic Biosensors based on Two-Dimensional NanoMaterials

Speaker: Professor Shuwen ZENG

French National Centre for Scientific Research (CNRS), France

Abstract

Surface plasmon resonance sensors are commonly used as an effective tool for real-time monitoring of biomolecular interactions. The sensing mechanism is based on the evanescent field perturbation at the metallic sensing substrate induced by the binding of chemical and biological molecules. Molecular binding interactions could be measured from the signal of reflected light, under the condition that the surface plasmon resonance is excited by the incident light. In this talk, I will present the use of hybrid 2D nanomaterials-based metasurface nanostructure as an enhanced sensing substrate. The thickness of the plasmonic sensing substrate is tuned at an atomic scale and optimized to improve the sensing capability. Here, both a sharp phase signal change and phase-related Goos-Hänchen signal shift were achieved due to the strong resonance at the surface of the sensing film. The enhanced plasmonic sensitivities of 2D nanostructures were systematically investigated. It is worth noting that the tunability of atomic layer led to the sensing substrate optimized with a narrow scale < 1 nm. Through a precise engineering of the metasurface substrates, 3 orders of magnitude improvement in sensitivity were demonstrated compared to the one with pure gold sensing substrate. This hybrid 2D nanomaterial-based metasurface would provide a good opportunity for developing portable theranostic devices in clinical applications.

Biography

Prof. Shuwen ZENG is currently a tenured CNRS academic researcher (Chargée de Recherche CNRS) at French National Centre for Scientific Research (CNRS), France. She has been awarded EU Marie Skłodowska-Curie Individual Fellow in 2018 with Photonics department at XLIM Research Institute, CNRS. She also worked as a research fellow at CNRS-International-NTU-THALES Research Alliance (CINTRA)/UMI 3288, Singapore from 2014 to 2018. Before that, she received the Ph.D. degree from the School of Electrical and Electronic Engineering at Nanyang Technological University, Singapore. Her main research interests focus on engineering optical micro-/nanostructures-based ultrasensitive chemical and biological sensors. Dr. Zeng is a member of the IEEE Photonics Society (IPS) and the Optical Society of America (OSA). She also currently serves as the main chair of Pacific Rim Conference on Lasers and Electro-Optics (CLEO Pacific Rim) and the IEEE Optoelectronics Global Conference (OGC) Technical Program Committees. She is also the associate editor of Sensors Journal and Journal of Frontiers of Nanophotonics in Biomedical Engineering. Dr. Zeng has published more than 60 peer-reviewed papers (Chemical Reviews, Chemical Society Reviews, Advanced Materials, Small, etc.) and contributed over 25 conference talks (CLEO, SPIE, ICMAT, etc.).

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

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