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Nanoscale engineering of metal nanostructures for early diagnosis of cancer

Early diagnosis plays an increasingly significant role in current clinical drive. Detection, identification, and quantification of low abundance biomarker proteins form a promising basis for early clinical diagnosis and offer a range of important medical benefits. Amplification of light from NIR fluorophores by coupling to metal nanostructures, i.e., metal induced fluorescence enhancement (MIFE), represents a promising strategy for dramatically improving the detection and quantification of low abundance biomarker proteins, and potentially increase already sensitive fluorescence based detection by up to three orders of magnitude. The amplification of the fluorescence system is based on interaction of the excited fluorophores with the surface plasmon resonance in metallic nanostructures. The enhanced fluorescence intensity due to the existence of metal nanostructures makes it possible to detect much lower levels of biomarkers tagged with fluorescence molecules either in sensing format or for tissue imaging. The first part of my talk will focus on some recent developments of plasmonic metal nanostructures by both "top-down" and "bottom up" methods. I will then discuss the prepared plasmonic nanostructures in the applications of biosensing.

Biography

Fang Xie was awarded her PhD in 2008 and was appointed as a Lecturer at Imperial College London in 2013. She is also Deputy Director for MSc in Advanced Materials in the Department of Materials. She has expertise in metal, semiconducting and oxide nano-materials synthesis and their applications in energy and life sciences. Her current research interests include plasmonic nanostructures for efficient light harvesting for solar cells and solar fuels, as well as in ultrasensitive biosensing and bioimaging applications. She has over 50 publications including 5 patents.

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