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Nanoscale engineering of plasmonic materials for biosensing

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 is a Senior Lecturer in Department of Materials, Imperial College London. She is also Deputy Director. She has expertise in functional nanomaterials including metal, semiconducting, and oxide nanomaterials synthesis, as well as the applications of the functional materials 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 bio-imaging applications. She has over 50 publications including five patents.

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