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Development a label-free plasmonic Apta sensor for pathogenic bacterial detection

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A localized surface plasmon resonance (LSPR)-Aptasensor that based on an immobilized DNA aptamer is developed and used for the label-free of pathogenic bacteria detection. In this project, the role of LSPR element size in the bacteria detection process is addressed by integrating fabricating multiple different sized nanosensors funtionalised with DNA aptamer. Colorometric bacterial detection was compared at gold nanodisks of 100 or 200 nm diameter. The concept is to open up LSPR sensors for detecting the main four pathogen threating the food safety and causing food-poisoning outbreaks; *Salmonella Typhimurium, Staphylococcus aureus, Listeria monocytogenes* and *E.coli.* The hole musk colloidal lithography (HMCL) has been used for the fabrication of short range ordered arrays of 100 or 200nm diameter (and 20nm high) Au nanodisks. A specific aptamer for S, aureus with a free thiol bond was immobilized to the gold nanodisks in different concentrations (10 or 20 µM). Changes in local refractive index around the nanodisks after bacterial capture (from approximately 106 cfu/ml after 30 or 60 minutes) showed significantly larger resonant wavelength shifts for 200nm nanodisks (~4.33nm) compared to 100nm (~0.31nm). The larger signal was a combination of higher bulk refractive index sensitivity of the longer wavelength resonance of the larger nanodisk and a more extended sensitive region.

Biography

Heba Khateb is a PhD student at Interdisciplinary Nano science Center at the University of Aarhus. Her research interests are label-free Plasmonic Apta sensor for pathogenic bacterial detection.

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