

LSPR-based Detection of Multiplex Pathogenic DNAs using Copper-Capped Nanoparticle Array Chip

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Localized surface plasmon resonance (LSPR) has been considered as a useful optical property for biosensor applications due to its local refractive index, which changes with composition, size, shape and local electric environments. Here we report the development of a 'Multi-spot Copper-Capped Nanoparticle Array (MC-NPA) chip' as a LSPR-based optical biosensor. Based on its LSPR properties of MC-NPA chips, multiplex sensing of pathogenic DNAs from reference bacteria and clinical isolates was possible in a quantitative manner with a detection limit of 10 fM (50 zmol), indicating that the plasmonic characteristic of the chips is shown to be highly sensitive to the biomolecular layer thickness. [This work was supported by the Technology Development Program to Solve Climate Changes on Systems Metabolic Engineering for Biorefineries (NRF-2012-C1AAA001-2012M1A2A2026556) and the Intelligent Synthetic Biology Center through the Global Frontier Project (2011-0031963) of the Ministry of Education, Science and Technology (MEST) through the National Research Foundation of Korea.