

Ultrasensitive and multiplex detection of pathogenic fungi using SERS sensor coupled with target recycling reaction

정혜나, 유승민, 강태준, 김봉수, 이상엽*

KAIST

(leesy@kaist.ac.kr*)

Here we report the development of an ultrasensitive and multiplex pathogen DNA detection method by combining patterned Au nanowire (NW)-on-film surface-enhanced Raman scattering (SERS) sensor with exonuclease III-assisted target DNA recycling reaction. Combining the high sensitivity of NW-on-film sensor and the target recycling reaction significantly improved DNA detection performance, resulting in the detection limit of 100 fM corresponding to 3 amole. By positioning Au NWs at specific addresses, multiple pathogen DNAs could be identified in a single step. Clinical sample tests with multiple genomic DNAs of pathogens showed the potential of this sensor for practical diagnosis of infectious diseases. [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.]