Preparation of Metal Nanograil Arrays with Tunable Multiple Dipolar Plasmon Modes

허철준, 김세헌, 장세규, 이수연, 양승만*
Center for Integrated Optofluidic Systems and Department of Chemical and Biomolecular Engineering, Korea Advanced Institute of Science and Technology
(smyang@kaist.ac.kr*)

Biomolecular detection using Localized Surface Plasmon Resonances (LSPR) has been extensively investigated because this technique enables label-free detection. The high-density metal nanopatterns with tunable LSPR characteristics have been used for refractive index sensing because LSPR property is highly sensitive to refractive index change of surroundings. Meanwhile, Colloidal lithography is a robust method for fabricating regularly ordered nanostructures in a controlled and reproducible way. From Finite-Difference Time-Domain Method (FDTD) simulations and reflectance spectra, we found that multiple dipolar plasmon modes were induced by gold nanograil arrays and each mode was closely related with structural parameters. LSPR characteristics of gold nanograil arrays could be tuned by varying the fabrication conditions to obtain optimal structures for LSPR sensing. Finally, gold nanograil arrays were applied as LSPR sensors for sensing of adsorption of biomaterials.