

Preliminary Study of Gold Nanostars/Enhanced Filter for Keratitis Microorganism Raman Fingerprint Analysis

Authors : Chi-Chang Lin, Jian-Rong Wu, Jiun-Yan Chiu

Abstract : Myopia, ubiquitous symptom that is necessary to correct the eyesight by optical lens struggles many people for their daily life. Recent years, younger people raise interesting on using contact lens because of its convenience and aesthetics. In clinical, the risk of eye infections increases owing to the behavior of incorrectly using contact lens unsupervised cleaning which raising the infection risk of cornea, named ocular keratitis. In order to overcome the identification needs, new detection or analysis method with rapid and more accurate identification for clinical microorganism is importantly needed. In our study, we take advantage of Raman spectroscopy having unique fingerprint for different functional groups as the distinct and fast examination tool on microorganism. As we know, Raman scattering signals are normally too weak for the detection, especially in biological field. Here, we applied special SERS enhancement substrates to generate higher Raman signals. SERS filter we designed in this article that prepared by deposition of silver nanoparticles directly onto cellulose filter surface and suspension nanoparticles - gold nanostars (AuNSs) also be introduced together to achieve better enhancement for lower concentration analyte (i.e., various bacteria). Research targets also focusing on studying the shape effect of synthetic AuNSs, needle-like surface morphology may possible creates more hot-spot for getting higher SERS enhance ability. We utilized new designed SERS technology to distinguish the bacteria from ocular keratitis under strain level, and specific Raman and SERS fingerprint were grouped under pattern recognition process. We reported a new method combined different SERS substrates can be applied for clinical microorganism detection under strain level with simple, rapid preparation and low cost. Our presenting SERS technology not only shows the great potential for clinical bacteria detection but also can be used for environmental pollution and food safety analysis.

Keywords : bacteria, gold nanostars, Raman spectroscopy surface-enhanced Raman scattering filter

Conference Title : ICBNN 2018 : International Conference on Biomaterials, Nanomedicine and Nanobiotechnology

Conference Location : London, United Kingdom

Conference Dates : March 15-16, 2018