Microparticles with hierarchical surface complexity for Surface Enhanced Raman Scattering toward molecular detection

황혜림, 김신현, 양승만*
한국과학기술원
(smyang@kaist.ac.kr*)

Surface Enhanced Raman Scattering (SERS) is one of the most sensitive spectroscopic tools for chemical and biological detection due to high sensitivity and label-free identification of molecules. However, conventional SERS systems based on planar metal patterns have the limitations in binding kinetics and cost of metal pattern preparation. In this study, we report the microparticles decorated with hierarchical surface complexity, which results in SERS-active properties. To obtain the microparticles with complex surface nanopatterns, photocurable ethoxylated trimethylolpropane triacrlate (ETPTA) droplets containing colloidal silica particles were prepared. Using microfluidic device composed of two coaxial capillaries, the monodisperse microparticles were obtained and silver nanoparticles were deposited on the exposed silica surfaces selectively after photopolymerization of emulsion droplets. With the silver nanoparticle-decorated microspheres, we could measure the enhanced SERS signal of various analytes adsorbed onto the patterned silver array.