Ag@Au core-shell coated polymeric nanopillar array for Surface-enhanced Raman spectroscopy with High Sensitivity and Stability

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Surface enhanced Raman spectroscopy (SERS) is a powerful spectroscopy techniques for detecting trace anounts chemicals and identifying them based on their unique vibrational characteristics. Based on this, the fabrication of SERS-active substrates for highly sensitive detection becoming an important issue.

In this study, we fabricated various shaped of polymeric nanopillar array which can be used as SERS substrate. The combination of multi-step anodizing and replication technique successfully produced the shape of nanopillar to unique morphologies and aspect ratio variations. Furthermore, nanopillar arrays were decorated with Ag@Au core-shell structure and their high sensitivity and an excellent reproducibility as SERS substrates. The SERS signal intensity obtained from Ag@Au coated nanopillar array substrate was linearly proportional to the concentration of the analyte and very appropriate in quantitative chemical biosensing.