Micromolding-Assisted Production of Cylindrical Plasmonic Microgels for Direct Raman Detection of Small Molecules

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To obtain surface-enhanced Raman scattering(SERS) signals with high sensitivity, the development of new metal nanostructures and nanoparticles has been of interest. Apart from this, measuring Raman signals from only target molecules is also considered important since many kinds of molecules present in complex biological fluids weaken the intensity of the Raman signal. In this study, we design cylindrical plasmonic microgels containing gold nanoparticles for direct Raman analysis of small target molecules in a complex medium such as biological fluids. A micromolding process is needed to confine gold and hydrogel precursors in cylindrical holes. Subsequently, UV is irradiated to polymerize the precursors, resulting in fabrication of the cylindrical plasmonic microgels. This microgel is characterized by hydrogel matrix and gold nanoparticles, each of which enables molecular size permeation and SERS performance, respectively.