Fabrication of Three-dimensional Plasmonic Structure by Using Hollow Nanoparticles as Building Blocks

백원흠, 강태욱†
서강대학교
(twkang@sogang.ac.kr†)

Three-dimensional (3D) plasmonic structures have attracted significant interest in various optical detections owing to a large number of plasmonic hotspots within a probe volume, compared to their low dimensional counterparts. However, the sensitivity of these 3D structures has been limited by diffusion of target molecules. In order to take advantage of 3D plasmonic hotspots in terms of sensitivity, target molecules should be free to diffuse into 3D structures. Here we report fabrication and characterization of layer-by-layer 3D assembly by using hollow nanoparticles. The hollow interior of our 3D assembly is expected to allow target molecules to freely diffuse into the assembly without diffusion limitation. The resulting 3D assembly is extensively characterized by UV-vis spectrophotometer, TEM, and SEM, respectively. In addition, surface-enhanced Raman spectroscopy is carried out to benefit from our 3D plasmonic hollow assembly.