

The investigation of Plasmonic Particles with Reduced Symmetry and Its Application

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Three dimensional plasmonic nanostructures with asymmetric shapes such as apple with wormhole have attracted considerable interest due to possible application to biophotonic imaging and sensing. However, the synthesis of these interesting structures is extremely difficult. Here, we introduced an innovative method to synthesize colloidal plasmonic nanoparticles with broken symmetry. First, gold was overgrown (or exchanged) on copper particles by using microwave irradiation. Surface-enhanced Raman scattering signal for the symmetry-broken nanoparticles becomes very high compared with regular nanoparticles. These nanoparticles could be used for optical plasmonics, for instance, targeting, sensing/imaging, gene delivery, and optical gene regulations.