

Metallic Nanohole Arrays with Localized Surface Plasmon Resonance

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Recently, surface plasmons or plasmonics have received great attention because of their potential applications such as surface plasmon resonance biosensors and surface enhanced Raman spectroscopy (SERS). Up to now, a number of methods using focused ion beam (FIB), nanoimprint lithography, and self-assembled colloidal template followed by electrochemical deposition of noble metals have been proposed to fabricate nanostructures with hole or void arrays, in which both surface and localized plasmons take place. Although aforementioned methods are effective for fabricating the nanostructured metal films, the integration of these structures into simple, low-cost devices for chemical or biological sensing is still challenging. We report here a versatile method that can generate hierarchical patterns of metallic nanocavities. First, monolayer of monodisperse colloidal particles was spun-cast on polymer films, and the particles were partially embedded in polymer layer. After the removal of colloidal particles, nanostructures with hole arrays were created by metal sputter deposition.