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Synthesis of porous gold nanostructures by controlled transmetallation reaction through a biological membrane

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Sacrificial template method using silver nanoparticles (AgNPs) of different shapes based on a simple galvanic replacement reaction (GRR) or transmetallation reaction (TM reaction) has been developed by several research groups to produce hollow gold nanostructures with tunable porosity and chemical composition¹⁻⁴. Porous gold nanospheres could be successfully produced at room temperature by the controlled TM reaction between Ag nanospheres and HAuCl_4 in aqueous medium through a dialysis membrane⁵. The formation of porous gold nanostructures through TM reaction involving sacrificial silver nanoparticles and Au_3^+ ions (HAuCl_4) controlled using a biological membrane (BM) is discussed in the talk. The formation of porous gold nanoparticles (Porous AuNPs) via TM reaction is monitored using UV-Vis absorption spectra. High resolution transmission electron microscopy (HRTEM) and field emission scanning electron microscopy (FESEM) confirms the formation of porous nanostructures. Energy dispersive spectroscopy (EDS) indicates the presence of only gold in the nanostructures. The potential of porous gold nanostructures synthesized using a simple room temperature process using a biological membrane in imaging is demonstrated using fluorescence microscopy of certain biological samples.

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