

Chiral gold nanoparticle superstructures directed by silica nanohelices: towards innovative chiro-optical properties

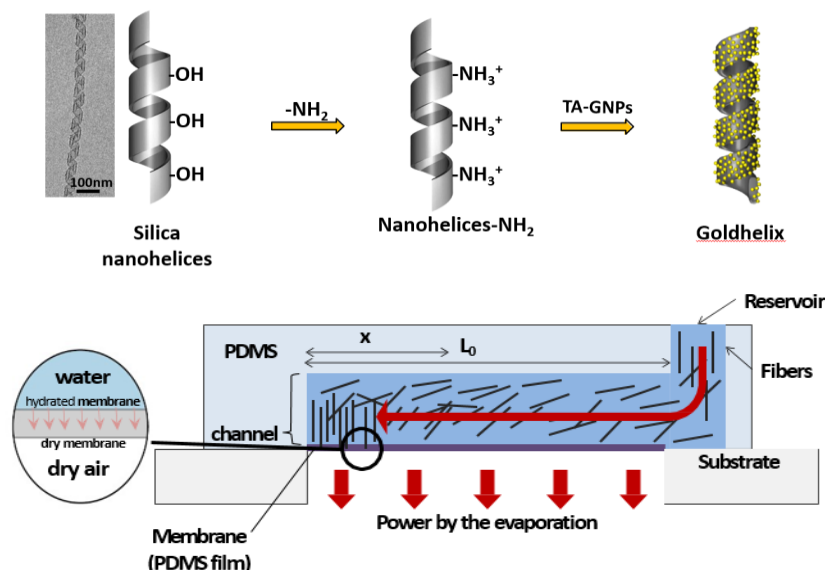
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Gold nanoparticles (GNPs) with extraordinary optical, surface plasmon resonance (SPR), electronic magnetic properties, have attracted numerous researchers' interests and potential applications in sensors, catalysis, optical and electronic nanodevices. [1-3]. Clusters, crystals, or extended arrays of nanoparticles display promising properties. We plan to manipulate the diverse collection structures of GNPs to achieve the specific optical character, by introducing silica helices substrate, which has fine controllable chirality [4]. Previously, we synthesized materials exhibiting well-defined chiral arrangement of GNPs following the helicity of silica nanohelices by electrostatic interactions. Now, we are dedicated to strengthen the force driving the GNPs on the surface of silica. The GNPs can transcript the chiralities from the silica helices. The plasmon chiroptical activity is observed in circular dichroism (CD) spectrometer in the wavelength of surface plasmon resonance of the GNPs. Furthermore, we apply a microfluidic device to organize the chiral Gold Helices into 3D metamaterials. And meanwhile, we focus on building covalent bonds between GNPs and silica helices, based on which we can organize gold nanoparticles optionally rather than limited in solution.



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