

Self-assembled clusters of ultra-smooth gold nanospheres

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The use of polyDADMAC as a stabilizer and the top-down etching process can be helped to make perfectly spherical gold nanoparticles with a very smooth surface, unlike the results that is followed common synthesis method. These ultra-smooth shapes can form more ideal point contact structures instead surface contact and lead to reliable experimental results. However, due to the presence of the polyDADMAC, it is difficult to use the common methods in gold nanoparticle research area. Because of the high entanglement effect of polyDADMAC and very strong positive charge property, there are restrictions on its use and application.

Long-chain polystyrene polymers are introduced to the particle surface through Au-S chemistry, giving the gold nanoparticles hydrophobic properties. Hydrophobic gold nanoparticles form clusters with various coordination numbers through oil-in-water emulsification. Due to their perfect shape, it is possible to produce repeatable and reliable repeatable results and fine-tune optical properties.