

### Customized Imaging Nanoplatfrom Based on Gold Nanocrystals

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Metal nanoparticles have the unique optical properties dependent on their shapes and sizes, which allowed them to be most useful in biosensor, bioimaging, etc. In particular, star-shaped gold nanoparticles (gold nanostar) have the strong plasmonic extinction in near IR region and rough and sharp morphology called as 'hot spot' which can afford to generate dramatic surface enhanced Raman scattering (SERS). Here, we introduce the gold nanostars (AuNSs) with several imaging modalities for molecular diagnostics. AuNSs were synthesized by PVP method efficiently, and the functionalities corresponding to the applications were introduced to the surface and the inside of AuNSs. The shapes and physical properties of nanoparticles at each step were characterized by TEM, ELS, etc. We synthesized by a simple and easy ways to get multifunctional gold nanostars in a higher yield. Thereafter, IR dye for NIRF and SERS signals and I-123 for radiation were added on or in the gold nanostars through the appropriate methods. Finally, universal and customized nanoprobcs with trimodalities of SERS, NIRF and radiation were evaluated by nano-SPECT/CT, IVIS and confocal Raman spectroscopy.