THIOL-ENDED SURFACTANTS FOR PASSIVATION OF GOLD NANORODS

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Abstract

Colloidal particles of non-spherical shapes possess many peculiar physical-chemical properties, which promise fundamentally new applications for optics, photovoltaics, chemical sensors, biomedicine and other areas. Among metallic nanoparticles the gold nanorods occupy an outstanding position, especially for their excellent plasmonic tunability. The combination of their unique physicochemical properties with the sizes ranging from a few to the tenths of nanometers has motivated the introduction of gold nanorods into biology and medicine as convenient labels, probes, or carriers on cellular and subcellular level. Appropriate surface coating and functionalization predispose gold nanorods for use in biomedicine, where the specific targeting is a major challenge for applications in many different areas (from diagnostics, imaging and sensing to therapy). In this work we compare application potentials of gold nanorods passivated with (16-mercaptohexadecyl) trimethyl ammonium bromide (MTAB), cetyltrimethylammonium bromide (CTAB), and thiolated polyethylene glycol (PEG), respectively, for targeted photothermal (hyperthermal) and photodynamic cancer therapy, for biomedical imaging using confocal and two-photon microscopes and for spectroscopy based on surface-enhanced Raman scattering (SERS).

Keywords: surfactants, Gold nanorods, surface-enhanced raman scattering, spectroscopy, hyperthermal therapy, theranostics, cancer

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