

Biocompatible heterostructured nanoparticles for multimodal biological detection

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Abstract: Hybrid nanoparticles are of significant interest primarily because of their innate multifunctional capabilities. These capabilities can be exploited when hybrid nanoparticles are used for applications in the biomedical sciences in particular, where they are utilized as multimodal nanoplatforms for sensing, imaging, and therapy of biological targets. However, the realization of their biomedical applications has been difficult, in part because of a lack of high quality hybrid nanoparticles which possess high aqueous colloidal stability and biocompatibility while retaining their multifunctionalities. Here, we present the development of inorganic heterodimer nanoparticles of FePt-Au with multifunctional capabilities including catalytic growth effects, magnetic resonance (MR) contrast effects, optical signal enhancing properties, and high colloidal stability and biocompatibility. Their multimodal capabilities for biological detection are demonstrated through their utilizations in the patterned biochip based detection of avidin-biotin interaction as well as in molecular MR imaging of neuroblastoma cells. Copyright © 2006 American Chemical Society.

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