

Nanochemistry and biotechnology

Silver-doped gold nanoclusters as new fluorescent biomarkers

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Nanoclusters (NCs) are a new class of metallic materials, which present distinct quantum-size effects, which lead to a discrete electronic structure in the core [1]. The size of AuNCs is comparable to the Fermi wavelength of electrons, which leads to size-dependent luminescence. They exhibit a high Stokes-shift, fluorescence tunability in the visible spectrum, and high photostability [2], which make them interesting alternative for highly toxic standard fluorescent probes used in identification and diagnosis in biomedicine. On the other hand, their main disadvantage is an insufficient fluorescence intensity. Here, we report on the synthesis of highly luminescent silver doped gold nanoclusters with quantum yield several times higher than standard NCs. The series of nanoclusters with various silver:gold ratio was fully characterized with spectroscopic methods (absorption, one and two – photon fluorescence, circular dichroism) and the morphology of the products were defined with transmission electron microscopy. To verify the possible application of nanoclusters in biological samples imaging the toxicity of the products was verified by MTT test. The results were compared with gold nanoclusters.

1. *Noguez C., Garzón I.* Optically active metal nanoparticles // *Chem. Soc. Rev.*-2009.-**38**.-P. 757-771.
2. *Luo Z., Zheng K., Xie J.* Engineering ultrasmall water-soluble gold and silver nanoclusters for biomedical applications // *Chem. Commun.*-2014.-**50**.-P. 5143-5155.