**Nanoplasmonics and surface enhanced spectroscopy**

**Peculiarities of fluorescence for interaction of gold nanocages with HTTH organic dye**

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Fluorescent materials are widely used for biological and medical research. In recent decades, researchers have paid increased attention to the interaction of fluorescent molecules with highly conductive metal nanostructures – a complex process that can lead to an increase or decrease in the excited state of the molecule [1]. Due to the fact that high-conductivity nanostructures are increasingly used in medicine, studies of the processes associated with the interaction of dye-metal nanoparticle are of high relevance. The technique of plasmon resonant energy transfer (PRET) allows to describe the influence of high-conductivity nanoparticles on the mechanisms of interaction both between individual fluorophores and in complex multidomain dyes. PRET-based approaches are already used to study the interaction of metal nanoparticles and surrounding substances, in particular various fluorescent molecules [2].

Іn this work, the effect of gold nanoparticles in the form of gold nanocages with a polymer coating on the multidomain dye 2,2′-(thiazolo[5,4-d]thiazole -2,5-diyl)bis(4-tert-butylphenol) (HTTH) was investigated. The studies were performed by means of absorption and fluorescence spectroscopy techniques. The fluorescence of HTTH solutions in ethyl alcohol was measured both without nanostructures and in the presence of aqueous solutions of gold nanocages of different concentrations. Comparison of the measured absorption and fluorescence spectra revealed significant spectral changes of the fluorescence spectrum with minimal changes in the absorption spectrum. Performed studies indicate a possible effect of gold nanostructures on the fluorescence of the HTTH dye by PRET-assisted plasmon-induced proton transfer.

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