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Spectroscopic studies of metallic nanostructures interaction with molecules of biological importance

Summary

The thesis dealt with topics related to the manufacture and plasmonic properties of metallic nanoparticles. The main research techniques was molecular spectroscopy in the ultraviolet to infrared range (200 – 14000 nm). Therefore, particular emphasis was put on observation of interaction phenomena derived from plasmon generated by the incoming electromagnetic waves with other molecules. Studies involved observation of enhancement or quenching of fluorescence, an increase in infrared absorption and Raman signal amplification. The effect of the research was the construction and use of the so-called plasmonic platform – assembly systems containing metallic nanostructures.

Another issue was the development of a new type of silver nanoparticle synthesis by using amphotericin B as a reducing agent. This approach made it possible to obtain a metallic core surrounded by an antibiotic. Further study of this system has shown that such nanoparticles exhibit not only plasmonic but also antifungal properties.