

Title: Surface plasmon resonance effects of gold colloids on optical properties of N719 dye in ethanol

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Abstract: In this work, the light absorption and emission effects of gold nanoparticles on some optical properties of N719 dye solution were studied via transmission electron microscopy, UV-vis absorption, and photoluminescence spectroscopy measurements. A facile method to fabricate four gold colloidal solutions with different concentrations containing ~15 nm gold nanoparticles was presented through pulsed laser ablation of a gold target immersed in ethanol, followed by a post-ablated size modification process. As-prepared gold colloids with different concentrations were mixed with certain dye solution. The absorption and fluorescence enhancement that resulted from the interaction between the dipole moments of the dye and the surface plasmon resonance of gold nanoparticles were found to be strongly dependent on the gold colloid concentration. Fluorescence was enhanced by around 9-fold, which was achieved for the dye solution with the highest gold nanoparticles concentration.