

The topic of the diploma thesis is chemical treatment of the surfaces of semiconductor nanocrystals CdS and CdSe in the form of thin nanocrystalline films prepared by chemical bath deposition. The evolution of photoluminescence and absorption spectra was investigated under treatment by water, toluene, butylamine, pyridine and hydrogen peroxide. The strongest changes were observed by samples soaked in water, pyridine and aqueous solution of pyridine. The observed effects were explained by partly dissolving of nanocrystals by water and affecting behaviour of photoexcited holes in the presence of the strong hole acceptor pyridine. The second part of this diploma thesis deals with photochromic properties of silver nanoparticles in a titanium oxide matrix. The photochromic behaviour of the samples was examined in detail. A phenomenological model of photochromic changes was suggested in analogy with the hole burning spectroscopy. In order to better understand the microscopic processes in this composite material other experiments were realized – e.g. samples were UV irradiated, or laser illuminated under lowered air pressure, pump & probe experiment. Under laser irradiation optical extinction of some nanoparticles was decreased. Simultaneously, changes of plasmon resonances of the rest of nanoparticles were observed, even though these nanoparticles had their plasmon resonance far from the incident light frequency.