The diploma thesis is devoted to multicolour photochromic effect in nanocomposite material Ag-TiO2, which is caused by a spectrally selective photoinduced decrease in extinction. The Thesis introduces briefly the theory of particle plasmons which are of fundamental significance for the investigated phenomenon. A short summary of the models and results published on photochromic effect in Ag-TiO2 is than given. The core of thesis deals with the optimization of this nanocomposite material towards a high photochromatic response. The influence of concentration of the TiO2 solution and of the speed of its spin coating deposition on a substrate was measured. Also the effect of AgNO3 quality used for sample preparation was monitored. A change in the extinction was found to depend on parameters of the excitation laser beam too. As a part of the optimization process, also the alternative TiO2 matrixes produced on basis of lamellar micelles were tested. The photochromic effect was monitored by measurements of the light extinction and scattering in dependence on the sample photoexposition. The properties of a set of the high-quality samples were studied using photoluminescence spectroscopy. Measurements of the photoluminescence decay with subpicosecond time resolution by up-conversion technique as well as of the time-integrated photoluminescence spectra were carried out. Both the effect of incorporated silver particles in the nanoporous matrix and that of ambient temperature and pressure were investigated. The results of these measurements have brought important information on the yet unambiguously understood microscopic mechanism of photochromic effect in Ag-TiO2, which might contribute to its description in the future.