Nonlinear optical properties of composites: metal alkanoate with Ag and Au nanoparticles

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The nonlinear optical properties of metal alkanoate composites with Ag and Au nanoparticles are investigated by technique Z-scan in the regime of the CW laser resonance excitation. Noble metal nanoparticles were synthesized in thermotropic liquid crystal phase of cobalt octanoate. The glassy nanocomposite samples were obtained by cooling the liquid crystal phase of materials down to the room temperature. Both the matrix (cobalt octanoate) and metal nanoparticles absorb light in the same visible region of the spectrum. The measurements of the nonlinear absorption coefficients and nonlinear refraction indices of nanoparticles-containing cobalt octanoate matrix have been obtained. The effect of the matrix optical properties on optical nonlinearity of embedded metal nanoparticles is discussed. The application of such materials to optoelectronics, optical limiters, and nonlinear spectroscopy can considerably enhance their effectiveness.