

Nanocomposites and nanomaterials

Linear and nonlinear optical properties of composite thin film PdO/Pd

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Palladium thin films were deposited on glass substrates annealing in atmosphere at 700 K. As a result of oxidation process of the upper layer of palladium film composite structure PdO / Pd are formed.

We have measured the absorption spectra of the films in the spectral range of 400 - 700 nm at temperatures $T = 293; 85; 77$ K (Fig.1). The observed peak absorption $\lambda = 460$ nm growing and shrinking at low temperatures may have an exciton nature.

We have studied of the optical nonlinear properties at wavelength $\lambda = 532$ nm located on the long wavelength side of the exciton band. A sufficiently high values of order nonlinear susceptibility $\chi^{(3)} \sim 1 \cdot 10^{-5}$ esu are received. It is shown that the nonlinearity has a negative sign.

The possible mechanisms of the received optical nonlinearity are discussed.

