

LINEAR AND NONLINEAR OPTICAL
CHARACTERIZATIONS OF TiO₂-BASED
HYBRIDS AT THE SELF-ACTION OF CW LASER
IRRADIATION AND PICOSECOND LASER PULSES

A.V. Uklein, V.V. Multian, V.Ya. Gayvoronsky

Institute of Physics, Nat. Acad. of Sci. of Ukraine
(46, Nauky Prosp., Kyiv 03680, Ukraine;
e-mail: uklein@iop.kiev.ua)

S u m m a r y

The impact of the concentration of TiO₂ nanoparticles on the optical and nonlinear optical (NLO) response of TiO₂-based hybrids is studied. The characterization of variations of the optical scattering, photoinduced absorption, and refractive index under the excitation of continuous (CW) and picosecond laser pulses of studied samples is performed. The manifestation of the cooperative effect of nanoparticles at concentrations higher $4.4 \times 10^{20} \text{ cm}^{-3}$ of Ti atoms is observed. The effect is accompanied with the enhancement of the efficiency of charge separation processes at the organic-inorganic interface and with the photoinduced Ti³⁺ centers polarizability reduction. The observed results indicate the optimal titanium concentration about $4.4 \times 10^{20} \text{ cm}^{-3}$ for the photonics application.