Propagation of Gaussian and singular light beams in photorefractive crystal $Bi_{12}TiO_{20}$

T.A. Kornienko, A.L. Tolstik
Physical Department, Belarusian State University, Minsk, Belarus, e-mail: tankorni@mail.ru

The paper has been devoted experimental research of spatio-temporal patterns of propagation of gaussian and singular light beams in crystal $Bi_{12}TiO_{20}$. General scenario of redistribution of energy in cross-section of select beams and conditions of self-focusing or defocusing has been described at different intensities of radiation. Dependence of time formation stable structures of research light beams on power of radiation has been determined. There has been showed if power of radiation increases processes of self-focusing and defocusing would be faster. At that time product of power of radiation and time of attainment of stable structures (exposure) remains constant and makes up several millijoules at characteristic dimension of light beam about several tens of microns at the input in crystal.

Spectroscopy of carbon nanotube complexes with oligonucleotides and DNA in thin LB-films

A.S. Egorov[a], V.P. Egorova[b], V.I. Krot[c], H.V. Krylova[c], I.V. Lipnevich[c], T.I. Orekhovskaya[d], B.G. Shulitsky[d], A.A. Veligura[b]
[a]*Center of Electron and Light Microscopy, Institute of Physiology, NAS of Belarus, Minsk, Belarus*
[b]*Belarusian Pedagogical State University, Minsk, Belarus*
[c]*Faculty of Physics, Belarusian State University, Minsk, Belarus, e-mail: grushevskaja@bsu.by*
[d]*Belarusian State University of Informatics and Radioelectronics, Minsk, Belarus, e-mail: shulitski@bsuir.by*

In the paper effective, novel self-assembled multi-walled carbon nanotube (MWCNT) complexes with oligonucleotides or DNA have been fabricated by Langmuir-Blodgett (LB) technology. The complexification which represents itself a wrapping of DNA- or oligonucleotide on MWCNTs in thin LB-films were successfully performed from inverse stearic-acid-based micelles. The micelles contain both MWCNTs and DNA- or oligonucleotides and are obtained by a simple sonication treatment method. Effects of CNT-enhanced micellar oligonucleotides compactification in Raman and dielectric spectroscopy have been investigated. The obtained complexes of MWCNTs with DNA or oligonucleotides were characterized in detail by fluorescent-probe spectroscopy, and scanning electron microscopy (SEM). An SEM image showed that MWCNTs were dispersed sufficiently and covered entirely with DNA or oligonucleotides. To test the interaction mechanisms of the oligonucleotide or DNA with MWCNTs, thermodynamic analysis and fluorescence intensity and