

Nanooptics and nanophotonics

Functionalized DNA thin films

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Nucleic acids and their derivatives attract a lot of attention of researchers due to their biological role. At the same time Deoxyribonucleic acid (DNA), which exhibits charge migration is a subject of interest for its physical properties, and particularly for a great potential of application in photonics and in molecular electronics[1,2]. However, in order to use DNA for this kind of applications, it has to be functionalized with active molecules. It is well known that the purified DNA dissolves only in water. Therefore, we performed additional processing in order to make DNA processable into thin films and more suitable for optoelectronics device fabrication with improved optical quality. The water soluble DNA was complexed with an appropriate cationic surfactant giving in this way a new type of nanocomposites, which is insoluble in water, but soluble in most of organic solvents. The obtained DNA-lipid complex can be processed into thin films by solution cast techniques. It can be also functionalised with active chromophores by doping and/or intercalation. In this work we report the processing of this complex into thin films and the preliminary results on linear and non-linear optical properties of thin films of functionalized DNA with active molecules. The films were characterized by the UV-VIS spectroscopy. Their nonlinear optical properties were studied by optical third harmonic generation. This comparative study allowed us to get information on the rotational contributions to cubic susceptibilities in these supramolecular structures.

1. *Grote J. G., Hagen J. A., Zettes J. S., Nelson R. L., Diggs D. E., Stone M. O., Yaney P. P., Heckman E., Zhang C., Steier W. H., Clarson S. J., Hopkins F. K. // J. Phys. Chem. B, -2004.-108.-P. 8584-8591.*