

Optically induced non-linear optical phenomena in novel 10-(benzyloxy)-3-bromo-6,8-dimethoxyanthracene-2-carbaldehyde

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The title compound belongs to the group of *o*-bromo(hetero)acetaldehydes constituting a new class of polycyclic, fused heteroaromatic compounds which has recently been synthesized by a new modification of the Friedel-Crafts cyclization of the OH protected *o*-acetal diarylmethanols in a one-pot procedure under acidic conditions [1]. This approach involves use of aromatic *o,o*-dibromodialdehydes and (hetero)aromatic monoaldehydes, and leads to the formation of chemically stable, photoactive products possessing photostability 40 times higher than anthradithiophenes. The planar acene cores in these compounds are substituted by 3 different types of functional groups (RO, Br and CHO) of both electron donating and electron withdrawing character that makes them donor-acceptor molecules of interesting photophysical properties [1].

The primary goal of this paper was to determine the suitability of the compound as a material for nonlinear optics. Thus, we will present the results of studies of the photoinduced absorption and of the related second harmonic generation (SHG) for the title compound. The photoinduced SHG was studied for the nanosecond Nd:YAG lasers at wavelength 1064 nm and induced by bicolour treatment at 1064/532 nm wavelengths. In addition to the photoinduced effects FTIR spectra were studied in order to explore the influence of the phonon subsystem. Moreover, in order to provide a detailed description of molecular structure of title compound and to characterize the intramolecular non-covalent interactions, the results of DFT, QTAIM and NCI calculations will be presented.

1. *Balczewski P., Skalik J., Uznanski P., Guziejewski D., Ciesielski W. Use of isomeric, aromatic dialdehydes in the synthesis of photoactive, positional isomers of higher analogs of o-bromo(hetero)acetaldehydes// RSC Adv.-2015.-5,-P. 24700-24704.*