BINARY CHROMOPHORE ORGANIC SYSTEMS AS A PROMISING ROUTE FOR OBTAINING ELECTRO-OPTICALY ACTIVE POLYMER COMPOSITES

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There is an enduring interest to use organic molecular systems as an active material in the nonlinear optical (**NLO**) devices. One of the possibilities to create such material is electrical field poled organic glasses containing noncentrosymmetrically arranged chromophores. High **NLO** efficiency and polar order (**PO**) stability are essential criteria's for device use. Key issues to achieve these goals are high molecular **NLO** efficiency of chromophore, as well, as high load of them. Usually highly effective chromophores have large ground state dipole moments. Unfortunately high dipole moment of chromophores, especially at high load, causes several undesirable effects diminishing overall **NLO** efficiency material such as:

- high dipole repulsion (when aliened parallel) [1,2];
- high dipole compounds aggregation with cancelled out dipole and nonlinearity [3];
- high dipole repulsion accelerates **PO** relaxation [4].

Recently novel approach [5] has been proposed to achieve large β values simultaneously providing a possibility to adjust dipole μ moment. In this approach, a strong neutral-ground-state (**NGS**) push- pull **NLO** chromophore is chemically linked with a zwitterionic (**ZWI**) chromophore in an antiparallel conformation. The overall dipole moment of such bichromophore should be approximately the difference of the dipole moments of the two chromophores. **NGS** chromophores have a β positive tensor element along the direction of the dipole moment, while zwitterionic chromophores have a negative β. As the dipole moments of the two chromophores are antiparallel, the overall should be the sum of the absolute value of the two chromophores' β values. Thus simultaneous increase of β and decrease of μ may be realized. Our proposal, instead of chemical binding [5] of **NGS** and **ZWI** chromophore in one molecule, is to combine **NGS** + **ZWI** chromophore μ and β control scheme with recent breakthrough technique [6] of binary chromophore organic glasses

(**BCOG**) supermolecular approach of guest host system. As **ZWI** guest was used indandione derivatives chromophore. Polyurethanes with indandione and azobenzene derivatives as the side chain chromophore and individual glassy state indandione derivative used as a host.

According to our knowledge there are no reports of using **ZWI** type of chromophore as guest to create such **NLO** active **BCOG.**

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