

Organic Crystals and Thin Films for Nonlinear Optics and Electro-optics

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We will present most recent results of novel high nonlinearity molecular crystals for nonlinear optics and electro-optics. These crystals are based on ionic or hydrogen bonding of new and known chromophores with large first-order hyperpolarizabilities [1].

Optical, electro-optical and nonlinear optical properties of high quality and large size DAST crystals [2], of hydrazone derivatives, and new co-crystals will be presented. It will be shown, that optimized parallel alignment of chromophores as well as optimum structures for phase-matched frequency mixing have been realized [3]. In addition we report on the measurement of the highest known phase-matchable nonlinear susceptibility coefficient of 200 pm/V determined recently in our laboratory [2].

Most recent results of molecular beam epitaxy of organic nonlinear optical molecules on glasses and crystalline substrates will be reported [4].

References:

- [1] P. Günter (Editor) "Nonlinear Optical Effects and Materials" Springer Series in Optical Sciences, Vol. 72 (Ed. P. Günter, Springer Verlag (2000)
- [2] Ch. Bosshard, K. Sutter, Ph. Prêtre, J. Hulliger, M. Flörshheimer, P. Kaatz and P. Günter "Organic Nonlinear Optical Materials" Volume 1 of "Advances in Nonlinear Optics" Eds. A.F. Garito and F. Kajzar, Gordon and Breach Publishers (1995)
- [3] M.S. Wong, F. Pan, M. Bösch, R. Spreiter, Ch. Bosshard, P. Günter and V. Grämlich "Novel Electro-Optic Molecular Cocrystals with Ideal Chromophoric Orientation and Large Second-Order Optical Nonlinearities" J. Opt. Soc. Am. B **15** (1), 426-431 (1998)
- [4] Ch. Cai, M. Bösch, M. Jäger, Ch. Bosshard, Z. Gan, I. Biaggio, I. Liakatas, M. Jäger, H. Schwer and P. Günter "Oblique Incidence Organic Molecular Beam Deposition and Nonlinear Optical Properties of Organic Thin Films with a Stable In-Plane Directional Order" Advanced Materials **11** (9), 745-749 (1999)