

**Book and Video Reviews****Nonlinear Optics, Lasers,  
Surface Analysis, NMR, etc. . . .**

**Organic Materials for Non-linear Optics.** Edited by *R. A. Hann* and *D. Bloor*, Royal Society of Chemistry, London 1989. xiv, 423 pp., bound, £ 45.00. — ISBN 0-85186-806-1

This book consists of the proceedings of the conference "Organic Materials for Non-linear Optics 1988" held at Oxford University in June 1988, and contains the manuscripts to the plenary lectures, short talks and posters presented at this meeting. The breadth of material covered here corresponds to the generality of the title and includes contributions over almost all current general themes in organic non-linear optics research.

The first section of this volume deals primarily with theoretical calculations of molecular nonlinearities. The plenary contributions from *Hurst*, *Munn*, *Morley* and *Pugh* point out the significant progress made in calculating second order nonlinearities. Other contributions, e.g. from *Garito* et al., indicate that progress has been made in understanding the microscopic basis of third order effects, but that our understanding is still full of gaps and uncertainties, as is our understanding of the correlation between molecular structure and crystal packing, as pointed out in the section on crystals by *Gavezzotti*.

The short section on materials characterization contains a discussion by *Meredith* of the pros and cons of various methods of characterization of NLO materials, as well as an interesting discussion of an application of parametric effects in fast infrared detection by *Hierle* et al.

The next section of the book contains numerous contributions on small organic molecules, as crystals, in solution, or in films, where "small" is taken to include oligomers as well. Here, there is a balance of detailed characterizations of previously reported compounds (*Bailey* et al. and *Bosshard* et al.) and reports of novel structures for both second and third order effects (e.g. *Blanchard-Desce* et al., *Davis* et al., but not limited to these). This aspect is continued in the subsequent short section on organometallics, which have up to now received probably too little attention.

The section on polymeric materials covers several aspects and types of effects in nonlinear optical polymers, from an overview of materials and possible devices (e.g. *Ulrich* and *Möhlmann*) to ultrafast third-order processes (*Prasad*), with contributions as well on synthesis, liquid crystalline polymers and gels. The next section on materials deals with Langmuir-Blodgett films and monolayers at the air-water interface. Among the plenary lectures, *Peterson* summarizes the use of LB films as media for characterization and the requirements for an eventual use of such films in all-optical or electro-optic devices. *Shen's* contribution summarizes the

utility of nonlinear optical methods to study interfacial phenomena in situ. Further short contributions deal with such subjects as polymer amphiphilics, orientation and deposition methods.

An eventual application of organic materials in nonlinear optics depends to a large extent on the ability to construct working devices out of them and integrate them into other systems. The contribution from *Stegeman* reviews proof-of-principle all optical  $\chi^{(3)}$  based devices, e.g. interferometers and directional couplers, but offers as well the sobering observation that we are several orders of magnitude away from substances which would lead to practical devices. The contribution from *Lytel* et al. shows on the other hand that we are much closer to commercial integrated optic devices on the basis of  $\chi^{(2)}$  polymeric substances, demonstrating that high speed electro-optic modulation in waveguides has already been achieved.

There is quite a bit of information on numerous subjects in this volume. With the plenary lectures, one often has the feeling that one has seen a good deal of it before, but such talks are usually intended to be overviews. The newer information is concentrated in the short poster contributions, which were however too numerous to mention individually here, and it is in these contributions that one is more likely to find results that have not yet been published elsewhere. A critical discussion of both the merits and disadvantages of organic materials in view of advances in inorganic materials would have been welcome, but this was perhaps more the responsibility of the participants than of the editors.

"Organic Materials for Non-linear Optics" summarizes the state of the art in organics for NLO, with a European emphasis, and contains contributions from many of the leading researchers in many aspects of the field. Thus the book can be useful to the researcher trying to attain or maintain an overview of the wide field of organic materials for nonlinear optics. For more detailed information one can always refer to further work from the numerous authors represented in the book.

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**Lasertechnik.** Grundlagen, Eigenschaften, Anwendung. VDI-Verlag, Düsseldorf 1989. DM 68. — ISBN 3-18-400879-0 (German language video cassette, 17 min.)

'Laser Technology' a la video show—Much too often we come home with a briefcase loaded with 'things to do' for the