The symposium "New Materials for Nonlinear Optics" was held at the American Chemical Society National Meeting, in Boston on April 22-26, 1990. The meeting was a success. Throughout the week the average attendance was over 150 people/session. Several speakers had attendance over 300. The ACS organized a press conference about the meeting, held on Wednesday April 25, 1990 at 2 pm At that time, the organizers devoted considerable time to educating the press about the importance of NLO research and the potential impact the NLO devices will have on the average person. The American Chemical Society is publishing an "ACS Symposium Series" monograph edited by the symposium organizers, to provide a permanent record of the proceeding of this meeting.
REPORT ON SYMPOSIUM ENTITLED: "NEW MATERIALS FOR NONLINEAR OPTICS"

Organized by: Seth Marder, Galen Stucky and John Sohn

The symposium "New Materials for Nonlinear Optics" was held at the American Chemical Society National Meeting, in Boston on April 22-26, 1990. The organizers had several specific goals in mind throughout the organization of this symposium. They were:

1) to expose chemists with little or no background in nonlinear optics (NLO) to the fundamental issues and concepts needed undertake an active NLO research program,

2) to provide a forum so that researchers with backgrounds in organic, semiconductor, organometallic, inorganic, polymer, crystal, and device NLO issues, could present distinctly different (sometimes antagonistic) viewpoints on the state of the art and future NLO research,

3) to expose US researcher to NLO research taking place in different countries,

4) to target research areas, we believed should contribute to future NLO research, but to date have been somewhat neglected by the NLO community,

5) to involve students and postdoctoral associates in the symposium,

Examination of the table of the schedule and the contents of the associated book (see attached) and the following description shows how we attempted to implement these goals:

1) On Sunday April 22, 1990 we held a full day tutorial to familiarize chemists with the followings topics; introduction to $\chi^{(2)}$ materials, introduction to $\chi^{(3)}$ materials; introduction to $\chi^{(2)}$ device issues, introduction to waveguided NLO applications, characterization of NLO materials, the role of theory for the design of NLO materials, and an overview of NLO materials. We anticipated an attendance of 50-75 peoples for these tutorials. The average attendance on Sunday was 200 people necessitating a change of venue to a ballroom. To further ensure that fundamental concepts were communicated to the chemists in the audience, several speakers gave overview talks. In particular, Daniel Chemla lectured on quantum well devices and Alistair Glass lectured on photorefractive materials,

2) the papers struck a balance among many different fields. No two consecutive sessions focused on the same topic and within a given session there were typically a variety topics covered. We chose this format to encourage the audience to sit through topics which were perhaps not directly related to their specific field of expertise,

3) speakers from England, France, Israel, Canada, Japan and China participated. The one change in the schedule was the cancellation of Dr. Wegner's presentation. Shortly before the meeting he sent us a FAX informing us that due to the rapid political changes, his presence was required in Germany. In Dr. Wegner's place, Dr. Seddon, from the University of Sussex, presented a paper on
polymer/crystalline composites. A paper relating to this work has recently appeared in Nature.

4) specific areas we targeted for inclusion in this symposium included: organometallic materials, quantum confined semiconductor clusters, hydrogen bonding and its impact on determining crystal structures, self assembly of polar structures, inclusion phenomena, factors determining the structures of LB films and biomolecules.

5) papers from twelve students or postdoctoral associates were presented. The presenter received $250 to help cover travel costs.

Perhaps the most obvious indication of the success of this symposium was the attendance. Throughout the week the average attendance was ~150 people/ session. Several sessions had peak attendances over 300. The last talk in the symposium held Thursday afternoon at 5PM had 50 people. The attendance was high and persistent. We estimate that roughly 800 different people attended the symposium for at least part of a session. This represents a considerable fraction of the ~11,000 scientists registered for the meeting. The ACS organized a press conference about the meeting, held on Wednesday April, 25, 1990 at 2 PM. At that time, the organizers devoted considerable time to educating the press about the importance of NLO research and the potential impact the NLO devices will have on the average person.

Our primary goal was to teach chemists about nonlinear optical research. There has never been a symposium designed with this specific goal in mind. As such, we believe that the symposium "New Materials for Nonlinear Optics" will have an important impact on chemists. It will be interesting to follow the number of papers presented at ACS meetings or published in chemical journals on NLO research over the next few years. The American Chemical Society is publishing an "ACS Symposium Series" monograph edited by the symposium organizers, to provide a permanent record of the proceeding of this meeting. It This monograph, entitled Materials for Nonlinear Optics: Chemical Perspectives, ACS Symposium Series 455 will be published late in February 1991. Attached is a copy of the table of contents for this book.

The final budget statement for the meeting is enclosed for your records.
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NEW MATERIALS FOR NONLINEAR OPTICS

Seth R. Marder, John E. Sohn, and Galen D. Stucky, organizers

Symposium Co-sponsored by the Division of Organic Chemistry
and the Division of Inorganic Chemistry
Crosslisted by the Division of Polymer Chemistry

Sunday, April 22, 1990 - Morning Session

Tutorial on Nonlinear Optics - Galen Stucky, presiding

9:00 Tutorial on the Design and Characterization of Materials for
Second Order Nonlinear Optics - David J. Williams

9:45 Third-Order Nonlinear Optical Effects in Molecular and Polymeric
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10:30 Break

10:45 Electro-Optic Polymer Waveguide Devices: Status and
Applications - Rick Lytel and Ferris Lipscomb

11:30 Waveguiding and Waveguide Applications of Nonlinear Organics -
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American Chemical Society National Meeting
April 22-27, 1990, Boston, MA

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Sunday, April 22, 1990 - Afternoon Session

Tutorial on Nonlinear Optics - Seth Marder, presiding

2:00 Studies of Nonlinear Optical Properties of Molecular and Polymeric Materials - J. W. Perry

2:45 The Chemical Structure Dependence of Electronic Hyperpolarizabilities - David N. Beratan

3:30 Break

3:45 Nonlinear Optical Materials: The Great and Near Great - David F. Eaton
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Crosslisted by the Division of Polymer Chemistry

Monday, April 23, 1990 - Morning Session
Organic Small Molecules - A.F. Garito, presiding

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8:55 Opening Remarks - A.F. Garito
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9:40 Chemistry of Anomalous-Dispersion Phase-Matched Second Harmonic Generation - Paul A. Cahill
10:10 Molecular and Macroscopic Second-Order Optical Nonlinearities of Organic and Organometallic Molecules - Seth R. Marder, B.G. Tiemann, J.W. Perry, L.-T. Cheng, and W. Tam
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10:55 Purple Membrane Nonlinear Optics and Applications - Aaron Lewis, Jung Y. Huang, and Zhingping Chen
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American Chemical Society National Meeting
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Monday, April 23, 1990 - Afternoon Session
Inorganics and Semiconductors - Galen Stucky, presiding

2:00 Opening Remarks - Galen Stucky

2:05 Optoelectronics of Quantum Confined Semiconductor Structures - D.S. Chemla

2:35 Preparation and Characterization of Small Semiconductor Particulates - Norman Herron


3:25 Break

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Tuesday, April 24, 1990 - Morning Session

\( \chi^{(2)} \) Polymers - Gary Bjorklund, presiding

9:00 Opening Remarks - Gary Bjorklund


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NEW MATERIALS FOR NONLINEAR OPTICS.

Seth R. Marder, John E. Sohn, and Galen D. Stucky, organizers

Symposium Co-sponsored by the Division of Organic Chemistry  
and the Division of Inorganic Chemistry  
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NEW MATERIALS FOR NONLINEAR OPTICS
Seth R. Marder, John E. Sohn, and Galen D. Stucky, organizers
Symposium Co-sponsored by the Division of Organic Chemistry and the Division of Inorganic Chemistry
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Tuesday, April 24, 1990 - Afternoon Session
Orientational Considerations - John Sohn, presiding

2:00 Opening Remarks - John Sohn

2:05 Approaches for the Design of Materials for Nonlinear Optics - M. Lahav

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Orientational Considerations - John Sohn, presiding

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NEW MATERIALS FOR NONLINEAR OPTICS

Seth R. Marder, John E. Sohn, and Galen D. Stucky, organizers

Symposium Co-sponsored by the Division of Organic Chemistry and the Division of Inorganic Chemistry Crosslisted by the Division of Polymer Chemistry

Wednesday, April 25, 1990 - Morning Session

$\chi^{(3)}$ Polymers - Donald Ulrich, presiding

9:00 Opening Remarks - Donald Ulrich

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NEW MATERIALS FOR NONLINEAR OPTICS

Seth R. Marder, John E. Sohn, and Galen D. Stucky, organizers

Symposium Co-sponsored by the Division of Organic Chemistry
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Wednesday, April 25, 1990 - Morning Session (continued)

$\chi^{(3)}$ Polymers - Donald Ulrich, presiding

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11:40 The Nonlinear Optical Properties of Sigma Delocalized Polymers - R.D. Miller
American Chemical Society National Meeting
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Wednesday, April 25, 1990 - Afternoon Session
Inorganics and Semiconductors II - Robert Laudise, presiding

2:00 Opening Remarks - Robert Laudise

2:10 Current Limitations and Future Opportunities for Nonlinear Optical Materials - Alastair M. Glass

2:40 Development of New Nonlinear Optical Crystals in the Borate Series - Chuangtian Chen

3:10 Strategy and Tactics in the Search for New Harmonic Generating Crystals - Stephan P. Velsko

3:40 Break


4:15 Defect Chemistry of Nonlinear Optical Oxide Crystals - Pat Morris

4:45 Defect Properties and the Photorefractive Effect in BaTiO₃ - Barry Wechsler, Robert Schwartz, Daniel Rytz and Marvin Klein
American Chemical Society National Meeting
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Thursday, April 26, 1990 - Morning Session
Organometallics - Seth Marder, presiding

9:00  Opening Remarks - Seth Marder

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10:05 Transition Metal Acetylides for Nonlinear Optics - Todd B.
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NEW MATERIALS FOR NONLINEAR OPTICS

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Thursday, April 26, 1990 - Afternoon Session (continued)

Contributed Papers - John Sohn, presiding


