POLYMERIC MATERIALS
Work Unit Directive (WUD) 43

Elizabeth T. Shinn

AUGUST 2002

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This technical report has been reviewed and is approved for publication.

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Nonmetallic Materials Division
Materials and Manufacturing Directorate

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14. ABSTRACT
This final report is a bibliography of technical journal articles, presentations, patents, and reports generated by members of AFRL/MLBP and collaborators. The work was accomplished at Wright-Patterson AFB over a period of 22 years and covers such areas as structural polymers, nonlinear optical polymers, and electrically conductive polymers.

15. SUBJECT TERMS
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Foreword

The following is a compilation of technical journal articles, presentations, patents, and reports generated by members of AFRL/MLBP and collaborators for the period of 1978-2001.

Robert C Evers, Chief
Polymer Branch
Nonmetallic Materials Division
1978
Additional Publications and Presentations


5. J. F. Wolfe, B. H. Loo, and F. E. Arnold, "Structural Modification of Rod-Like Aromatic Polymers", Accepted for presentation at the 177th National Meeting, American Chemical Society, Symposium on Anisotropic Solutions and Melts (1979)


1979
Additional Publications


3. M. W. Wellman, "Model Systems for Aromatic Heterocyclic Structures of 2,6-Diphenylbenzo-(1,2-d: 4,5-d\textsuperscript{1}) Bisthiazole and 2,6-Diphenylbenzo-(1,2-d: 5,4-d\textsuperscript{1}) Bisthiazole," presented at the American Crystallographic Association, Boston, MA (August 1979).


10. AFML-TR-79-4184, M. W. Wellman, W. W. Adams, D. R. Wiff and A. V. Fratini, "Model Compound Studies of Rigid Rod Aromatic Heterocyclic Polymer Systems, Part I: The Crystal and Molecular Structures of 2,6-Diphenylbenzo-(1,2-d: 4,5-d\textsuperscript{1}) Bisthiazole and 2,6-Diphenylbenzo (1,2-d: 5,4-d\textsuperscript{1}) Bisoxazole", (1980).


1982
PUBLICATIONS, PATENTS, TECHNICAL REPORTS AND PRESENTATIONS FOR PAST YEAR

WUD #43


60. "Kinetics Of Thermoset Curing In the Glassy Region", Gordon's Conference on Chemical Characterization of Structural Polymers. (June, 1982).


1983


30. M. E. Hunsaker, W. W. Adams, and A. V. Fratini, "Hydration Studies on Polybenzimidazole Polymers via the Crystal Structure of 2,6-Diphenylbenzo-(1,2-d;5,4-d') Uimidazole Tetrahydrate, C_{22}H_{14}N_{4}·4H_{2}O, A Model Compound," to be presented at the 32nd Annual Denver X-ray Conference of Applications of X-ray Analysis, Snowmass, CO, (1983).


64. AFWAL-TR-83-4055, "Model Compound Studies of Rigid Rod Aromatic Heterocyclic Polymer Systems, II: The X-ray Crystal Structure of 2,6-diphenylbenzo (1,2-d;5,4-d') Diimidazole Tetrahydrate C_{34}H_{26}N_{4}4H_2O, A Model System for the Study of Polymer-Water Interaction in PolybenZimidazoles," M. E. Hunsaker, W. W. Adams, and A. Fratini, (1983).
WUD LIST OF PUBLICATIONS, PRESENTATIONS, TR'S AND TECHNICAL PAPERS


T. E. Helminiak, "Ordered Polymers and Molecular Composites," Presented at DARPA Workshop on Advances and Opportunities in Polymer Research, La Jolla, CA (1985)

S. J. Bai, "Crosslink Distribution of Epoxy Networks Studied by Small-angle Neutron Scattering," Polymer, 26, 1053 (1985)


T. E. Helminiak, "Rigid Rod Polymers and Their Use As Fiber and Film Reinforcement," Presented at Lockheed California Company, Burbank, CA (1984)

Loon-Seng Tan and F. E. Arnold, "Bis-(1,2-Dihydrobenzocyclobutene) Terminated Imide Oligomers - Synthesis and Polymerization." Patent Disclosure


D. R. Wiff, W.-F. Wang, S. Timms, and T. E. Helminiak, "Rheology Studies on The Rigid Rod Molecular Composite, Poly-p-phenylene benzobisthiazole/Nylon 66," Presented at the 56th Annual Meeting Society of Rheology, Blacksburg, VA, (Feb 85)


T. Tsai, W.-F. Hwang and F. E. Arnold, "High Strength High Modulus ABA Block Copolymers," 189th National Meeting American Chemical Society, Miami Beach, FL, Polymer Preprints, Vol 26, 1, 144 (1985)


B. A. Reinhardt and F. E. Arnold, "High Temperature Polymers Containing Enyne Linkages," Presented at the 17th Central Regional Meeting of the American Chemical Society, Akron, OH (1985)

F. E. Arnold, "Other High Performance/High Temperature Polymers," Presented at the American Chemical Society Polyimide Workshop, Reno, NV (1985)


S. Kumar, D. B. Anderson, and W. W. Adams, "Crystallization and Morphology of Poly(Aryl-Ether-Ether Ketone)," Polymer, Accepted July 1985


W. W. Adams and T. E. Helminiak, "Ordered Polymers and Molecular Composites," Presented at the Second International Conference on Ultrastructure Processing of Ceramics, Glasses, and Composites, Palm Coast, FL (February 1985)

D. P. Anderson, S. Kumar and W. W. Adams, "Wide Angle X-ray Diffraction as a Tool to Examine the Morphology of Semicrystalline Thermoplastic Matrix Composites," Presented at the American Chemical Society Meeting, Miami Beach, FL (March 1985)


W. W. Adams, "Ordered Polymers and Molecular Composites," Presented at The John Hopkins University, Baltimore, MD (April 1985)

W. W. Adams, "Ordered Polymers and Molecular Composites," Presented at 3-M Corporation Polymer Science Series, Minneapolis, MN (April 1985)


W. W. Adams, "Molecular Composites," Presented at the AFWAL Reserve Meeting, AF Institute of Technology, WPAFB, OH (June 1985)


C. Lee, "Isoimide-imide Conversion After Vitrification," Presented at the SAMPE Meeting, Anaheim, CA, March 1985


C. Y-C. Lee, "Cure Properties of AT Resins," Presented at the Jet Propulsion Laboratory, Pasadena, CA, April 1985


C. Y-C. Lee, "Curing Processes on Acetylene Terminated Resins," Advanced in Reinforced Plastics, to be published


I. J. Goldfarb and E. G. Jones, "Characterization of High Temperature Polymers by TGA/MS," Presented at the National Meeting American Chemical Society, Miami Beach, FL (April 1985), ACS Polymer Preprints 26 (1) 17 (1985)


A. C. Lind, C. G. Fry and I. J. Goldfarb, "Characterization of Acetylene-Terminated Resin Cure States Using HNMR," Presented at the National Meeting American Chemical Society, Chicago, IL (September 1985)


AFWAL-TR-86-4042, S. Kumar, D. P. Anderson and W. W. Adams, "Crystallization and Morphology of Poly (aryl ether ether ketone)," to be published 1986


S. Kumar and W. W. Adams, "X-ray Studies of Thermosetting Resins," American Chemical Society Meeting, Chicago, IL (September 1985)


S. Kumar, Lecture at Dow Chemical (Midland) on, "Compressive Strength of High Modulus Fibers. (August 1986)


F. E. Arnold, "Synthesis of Ladder and Rigid Rod Polymers," presented at the Symposium on Advances in Polymer Synthesis in honor of Professor Michael Szwarc, University of Southern California, Los Angeles, CA (1985)


I. J. Goldfarb, "Characterization of Crosslinking Polymers," presented at Short Course on Crosslinked Polymers, Tokyo, Japan (1986)

J. Goldfarb, "High Temperature Crosslinked Polymers, presented at Short Course on Crosslinked Polymers, Tokyo, Japan (1986)

I. J. Goldfarb, "Characterization of Crosslinking Polymers," presented at Short Course on Crosslinked Polymers, Lucern, Switzerland (1986)


I. J. Goldfarb, "High Temperature Crosslinked Polymers," presented at Short Course on Crosslinked Polymers, Lucern, Switzerland (1986)


T. E. Helminiak, "Rigid Rod Polymers and Their Composites," Case-Western Reserve U., Cleveland, OH (1986)

T. E. Helminiak, "Rigid Rod Molecular Composites," presented at University of Akron, Akron, OH (1986)


R. C. Evers, "Thermally Stable Polymers," presented at Short Course on Frontiers of Polymer Science, Akron, OH (1986)
1987
WUD LIST OF PUBLICATIONS, PATENTS, PRESENTATIONS AND TECHNICAL REPORTS


F. E. Arnold, 'Rigid-Rod Benzazole Heterocyclic Polymers, Presented at Short Course on High Temperature Polymers, Tokyo, Japan (January 1987).

F. E. Arnold, 'Acetylene Containing Polymers, presented at Short Course on High Temperature Polymers, Tokyo, Japan (January 1987).


F. E. Arnold, 'Acetylene Containing Polymers', Symposium on Recent Advances in Polyimides and Other High Performance Polymers, Reno, NV (July 1987).


T. E. Helminiak, "Opportunities for PBZ Polymers", Dow Western Division Seminar, Walnut Creek, CA (September 1987).


T. E. Helminiak, "Reinforcement of Polymers by Rigid Rod Macromolecules", 18th Akron Summit Polymer Conference on Ordered Polymers, University of Akron, Akron, OH (June 1987).


T. E. Helminiak, 'Air Force Molecular Composites Research', Dept. of Materials Science Seminar, University of Virginia, Charlottesville, VA (December 1986).


F. E. Arnold, H. Chuah and L. S. Tan, Bisbenzocyclobutene (BCB): An
Acid-Stable Thermoset Matrix Host for Molecular Composites", SAMPE Proceedings, April 1988 (In print).


S. Kumar, W. W. Adams, and T. E. Helminiak, 'Uniaxial Compressive Strength of High Modulus Fibers for Composites', accepted for publication in Journal of Reinforced Plastics and Composites. This paper was also presented at the following meetings: (a) International Symposium on Approaches to Property Limits, Princeton, NJ, August 1986; (b) American Society for Composites, Dayton, OH, October 1986; and (c) Air Force Ordered Polymers Meeting, Dayton, OH October 1986.


W. W. Adams, 'Ordered Polymers and Rigid-Rod Molecular Composites,' Invited Lecture, Okayama University, Okayama, Japan (August 1986).


W. W. Adams, 'Ordered Polymers and Rigid-Rod Molecular Composites,' Invited at the UBE Industries Co., Hirakata, Japan (September 1986).


1988
MILESTONE 37: CHOOSE APPROPRIATE GENERIC CHEMICAL STRUCTURES FOR POLYMER SYNTHESIS FOR NLO ACTIVITY.

Although considerable progress has been made in understanding molecular structure/NLO activity relationships, some important data remains to be obtained in order to make a more judicious selection of generic chemical structures for polymer synthesis. While beno-bisthiazole structures containing thiophene groups show considerable promise, the relationship of NLO activity to polymer molecular weight still needs to be determined and will be addressed in new milestone 41. The present milestone will accordingly be moved to October 1989 to follow completion of milestone 41.

MILESTONE 39: SYNTHESIS OF IMPROVED NLO ORDERED POLYMERS

This milestone will be moved to September 1990 and will follow milestones 37 and 41.

FY 88 Publications


54


Patents


Technical Reports


Presentations


R. C. Evers and M. Dotrong, "Articulated Rigid-Rod Polymers


J. L. Burkett and F. E. Arnold, "Phenylbenzthiazole Pendant


PUBLICATIONS:


In addition, 17 refereed papers from the 1988 Fall Research Meeting of the Materials Research Society are scheduled for publication late this year and will be listed in the FY91 WUDA.
ATENTS:


R. C. Evers, T. Dang, and D. R. Moore, "GRAFT COPOLYMERS OF POLY(P-PHENYLENEBENZOBISIMIDAZOLE)", U. S. Patent Application SN 07/34525

P. M. Lindley, B. A. Reinhardt, F. E. Arnold, "HIGH TEMPERATURE SOLVENT RESISTANT AMORPHOUS THERMOPLASTIC RESIN COMPOSITIONS", U. S. Pat No. 4,731,442 (1988)


PRESENTATIONS:


2. Dotrong and R. C. Evers, "RIGID-ROD BENZOBISTHIAZOLE POLYMERS WITH REACTIVE FLUORENE MOIETIES: I. SYNTHESIS AND PRELIMINARY CHARACTERIZATION", 197th National Meeting, American Chemical Society, Dallas, TX (Apr 1989)

3. C. Evers, "SYNTHESIS APPROACHES TO SINGLE COMPONENT MOLECULAR COMPOSITES", Akron Polymer Conference, Akron, OH (Apr 1989)


5. F. E. Arnold, "ORDERED POLYMER TECHNOLOGY: AN APPROACH TO CONDUCTING MATERIALS", Geneco Corp, Research Center, Akron, OH (May 1989)

6. F. E. Arnold, "AN OVERVIEW OF AF ORDERED POLYMER TECHNOLOGY", Ohio State University, Columbus, OH (Jun 1989)


10. L. S. Tan, "THERMOSETTING BLENDS COMPRISING A BISBENZOCYCLOBUTENE AND SOME SELECTED BISDIENOPHILES", Chemistry Seminar, Department of Chemistry, Virginia Commonwealth University, Richmond, VA (Feb 1989)


W. Adams and S. Kumar, "CONVENTIONAL VS. MOLECULAR COMPOSITES - PAST, PRESENT AND FUTURE", 4th International Conference on Ultrastructure Processing of Ceramics, Glasses and Composites, Tucson, AZ (Feb 1989)


W. W. Adams, "ORDERED POLYMERS AND RIGID-ROD MOLECULAR COMPOSITES", Department of Macromolecular Science, Case Western Reserve Univ., Cleveland, OH (Apr 1989)

W. W. Adams, "ORDERED POLYMERS AND RIGID-ROD MOLECULAR COMPOSITES", Materials Science Colloquia, Univ. of Virginia, Charlottesville, VA (Apr 1989)


TECHNICAL REPORTS


1990
PUBLICATIONS: PATENTS: TECHNICAL REPORTS AND PRESENTATIONS:

PUBLICATIONS: (Refereed)


**PUBLICATIONS (Un refereed)**


PRESENTATIONS


W. W. Adams, "Rigid-Rod Polymers - The Ultimate in Polymer Properties?" School of Materials Engineering, Georgia Institute of Technology, Atlanta, GA (February 1990).


R. C. Evers, "Rigid-Rod Molecular Composites," Ohio Aerospace Institute Polymer Focus Group, Cleveland, OH (July 1990).

TECHNICAL REPORTS


PATENTS


PUBLICATIONS, PATENTS, PRESENTATIONS AND TECHNICAL REPORTS

Publications: (Refereed)


Presentations:  (* Indicates invited paper)


*R. C. Evers, "Recent Advances in Molecular Composites From PBZT and PBO Rigid-Rod Polymers," Ultraloy '90, Houston, TX (November 1990).


*D. S. Dudis, "Insight into Conducting Polymers from a Computational Vantage Point," Department of Chemistry, Memphis State University, Memphis, TN (April 1991).


Patents:


Technical Reports:


1992
Publications: 
(Refereed)


Publications: (Unrefereed)


J.B. Ferguson, "Calculation of the Photoabsorption Spectrum for Subband to Continuum Transitions in GaAs/AlGaAs Multiple Quantum Wells," Thesis for Master of Science Degree in Physics, Wright State University (1992).


Patents:


Presentations: (* Indicates invited paper)


*R.C. Evers, "Molecular Composites from Rigid-Rod Polymers," Max Planck Institute for Polymer Research, Mainz, Germany (July 1992).


J.B. Ferguson, "Calculation of the Subband-to-Continuum Photo-Absorption Spectrum of GaAs/AlGaAs Multiple Quantum Wells," Fall Meeting, Ohio Section of the American Physical Society, Dayton, OH (October 1992).


*D. S. Dudis, "Computational Chemistry Contributions in Conducting Polymer Development" Department of Physics, the Ohio State University, Columbus, OH (October 1991).


S. Trohalaki, "Quantum Mechanical and Molecular Dynamics Simulations of Rigid-Rod Polymers and Model Compounds," Department of Chemistry, Washington University, St. Louis, MO (July 1992).

Technical Reports:


1993
Publications, Patents, Presentations, and Technical Reports

Publications: (Refereed)


Publications (Unreferred)


Patents:


Presentations: (*Indicates invited papers)


H. H. Song, M. Dotrong, and R. C. Evers, "Chain Extension and Inter-Chain Packing Order in Rigid-Rod Polymers as Determined by WAXD," 204th National Meeting of the American Chemical Society, Denver, CO (April 1993).


*F. E. Arnold, "Rigid-Rod Polymers and Molecular Composites," 4th Interdisciplinary Symposium on Polyimides and Other High Performance Polymers, Sparks, NV (January 1993).


*D. M. Husband, "Die Existenz einer statischen Fließspannung in Suspension unit nichtkolloidalen Teilchen," Institut fuer Kunststofftechnologie, University of Stuttgart (June 1993).


G. P. Das, and D. S. Dudis, "A Comparison of Ab Initio and Model Hamiltonian Methods Applied to the Low-Lying States of Polymers," Northeastern Regional Meeting of the American Chemical Society, Northeastern University, Boston, MA (June 1993).

S. Trohalaki and D. Dudis, "Ab Initio Molecular Orbital Investigation of Intramolecular Hydrogen Bonding in Hydroxy-Substituted Poly(p-phenylene Benzobisimidazole) and Poly(p-phenylene Benzobisoxazole)," Northeastern Regional Meeting of the American Chemical Society, Northeastern University, Boston, MA (June 1993).


*D. S. Dudis, A. T. Yeates, D. Kost, D. Smith and J. Medrano, "New Insight into Solitons and Bipolarons in Conjugated Polymers," Cavendish Laboratory, Department of Physics, Cambridge University, Cambridge, UK (June 1993).

Technical Reports:

None
1994
Publications, Patents, Presentations, and Technical Reports

Publications: (Refereed)


Publications: (Un refereed)


**Patents:**


**Presentations:** (*indicates invited papers)


A. Agrawal and C.S. Wang, "In-Situ High Temperature Electrical Conductivity of Ladder Polymer BBL," Materials Research Society Symposium, Boston, MA (December 1993).


*S.J. Bai, "Physical Properties and Applications of Rigid-Rod Polymers," Physics Department, Wright State University, Dayton, OH (January 1994).


C.S. Wang, J. Burkett, and F.E. Arnold, "Electrical Conductivity in Highly Oriented Ladder Polymer BBL," 207th National Meeting of the American Chemical Society, San Diego, CA (March 1994).


C.S. Wang, J. Burkett, and F.E. Arnold, "Electrical Conductivity in Highly Oriented Ladder Polymer BBL," 207th National Meeting of the American Chemical Society, San Diego, CA (March 1994).

*J.P. Chen and F.E. Arnold, "Synthesis of Functionalized High Temperature Polymers for Polymer-Silicarn Hybrid Materials," 207th National Meeting of the American Chemical Society, San Diego, CA (March 1994)


Publications, Patents, Presentations, and Technical Reports

Publications: (Referred)


S. Trohalaki and D. S. Dudis, "Barrier to Phenyl Rotation in Poly(p-phenylenebenzobisthiazole) from AB Initio Molecular Orbital Calculations," Polymer, 36, 911 (1995).


Publications: (Unrefered)


**Patents:**


Presentations: (*indicates invited papers)


*D. Dean, "Morphological Investigations of Rigid-Flexible and Rigid-Rod Liquid Crystalline Polymers," Chemistry Department, Tuskegee University, Tuskegee, AL (September 1995).


*D. S. Dudis and A. T. Yeates, "Conducting Polymers and Molecular Design," Department of Chemical Engineering, University of Cincinnati, Cincinnati, OH (May 1995).


**Technical Reports:**


1997-1998

PUBLICATIONS, PATENTS, PRESENTATIONS, AND TECHNICAL REPORTS

Publications: (Refereed)


Publications: (Unreferred)


PATENTS


PRESENTATIONS: (*indicates invited papers)


D. R. Dean, "Morphological Investigations of Rigid-Flexible and Rigid-Rod Liquid Crystalline Polymers," Tuskegee University Chemistry Department, Tuskegee, AL (September 1995).


D. R. Dean, "Understanding the Relationship between the Chemical Structure and Physical Properties of Substituted Poly(paraphenylenes)," Wright State University Chemistry Department, Fairborn, OH (January 1996).


J. Henes, R. Vaia and D. Dudis, "Molecular Dynamics Simulations of Poly(paraphenylenes) and Various Substituents," 28th American Chemical Society Central Regional Meeting, Dayton, OH (June 1996).


A. V. Fratini, M. L. Chabinyc, A. D. McFarland, H.H. Song, and D. S. Dudis, "Fiber Diffraction Studies of Rigid Rod Polymer Poly(2-Bicyclo[2.2.2]octanebenzobisthiazole) and Crystallographic and Ab Initio
Molecular Orbital Analysis of Bicyclo[2.2.2]octane-bisbenzothiazole Model Compound,” 28th American Chemical Society Central Regional Meeting, Dayton, OH (June 1996).


Technical Reports:
None
1997
PUBLICATIONS, PATENTS, PRESENTATIONS, AND TECHNICAL REPORTS

Publications: (Refereed)


129


**Publications: (Unrefereed)**


Publications: (Submitted)


**Patents:**


Presentations: (*Indicates invited papers)


* R. J. Spry, "Anisotropic Optical Attenuation in a Planar Waveguide of stretched Copolyester Film," Wright State University, Physics Department Seminar (November 1996).


P. T. Mather, Angel Romo-Uribre and C. D. Han "In-situ Polarizing Optical Microscopy of a Flow-Induced Isotropic- Nematic Transition in a Thermotropic Liquid Crystalline Polymer," 68th Annual Society of Rheology Meeting, Galveston, TX (February 1997).

Angel Romo-Uribre, P. T. Mather, and C. D. Han, "Rheo-x-ray Scattering of Thermotropic LCP'S with Flexible Spacers in the Main-Chain," 68th Annual Society of Rheology National Meeting, Galveston, TX (February 1997).


* D. Dean, "Morphology and Crystal Structure of Thermotropic Poly(Azomethine ethers)," Department of Chemistry, Wright State University, Dayton, OH (May 1997).


Technical Reports:

None
1998
Publications: (Refereed)


Publications: (Unreferred)


Publications: (Submitted)


Lectures, Presentations, Talks: (*indicates invited presentations)


*P. T. Mather, “Mechanical Relaxation in Inorganic-Organic Hybrid Thermoplastics,” University of Dayton, Graduate Materials Science Seminar Series, Dayton, OH (December 1997.)
Publications: (Refereed)


Publications: (Unrefereed)


Publications: (Submitted)


Lectures, Presentations, Talks: (*indicates invited presentations)


*P. T. Mather, "Rheo-Optics of Polymeric Liquid Crystals," Kent State University, Liquid Crystal Institute, Kent, OH (August 1998).


* R.A. Vaia, “Recent Developments in Polymer - Layered Silicate Nanocomposites,” University of Cincinnati, Department of Materials Science and Engineering, Cincinnati, OH (October 1997).

Publications: (Referred)


Publications: (Unreferred)


Publications: (Submitted)


Lectures, Presentations, Talks: (*indicates invited presentations)


D. J. Miller, A. Wilson and D. S. Dudis, “Electronic Structure Development in Polysquaraines Containing Pyrrole and Bipyrrrole,” 30th Central Regional Meeting, American Chemical Society, Cleveland, OH (May 1998).


X. Duan and D. S. Dudis, “Theoretical Calculations to Determine the Relative Stabilities of 1,2- vs. 1,3-Squarates,” 30th Central Regional Meeting, American Chemical Society, Cleveland, OH (May 1998).

D. Kost and D. S. Dudis, “The Quinoid/Aromatic Tranistion in Conjugated Polymers,” 30th Central Regional Meeting, American Chemical Society, Cleveland, OH (May 1998).


X. Duan and D. S. Dudis, “Relative Stabilities of 1,2- vs. 1,3-Squarates and Croconates,” 216th American Chemical Society National Meeting, Boston, MA (August 1998).

Invention Disclosures and Patents Granted:


Publications: (Refereed)


Publications: (Unrefereed)


**Publications: (Submitted)**


*B. A. Reinhardt, "Highly Active Two-Photon Materials: Synthesis Applications and Opportunities," University of Toledo, Toledo, OH (April 1998).


Hyun Hoon Song, Jee-Young Han, Derrick D. Dean and Loon-Seng Tan, "Liquid Crystalline Behavior of Benzobisthiazole Derivatives With or Without Dihydroxy Moiety," Korea-Japan Joint Forum '98 on Organic Materials for Electronics and Photonics, Hokkaido University, Sapporo, Japan (June 1998).


G. P. Das and D. S. Dudis, “Ab Initio Sum-Over-States Approach to the Calculation of Two-Photon Absorption Cross Sections for Molecules in Solution,” 30th Central Regional Meeting, American Chemical Society, Cleveland, OH (May 1998).


Invention Disclosures and Patents Granted:


Publications (Refereed):


Publications (Unreferred):


Publications (Submitted):


Lectures, Presentations, Talks (* indicates invited presentation):

*M. R. Unroe, "Endcapped Polyarylene Ether Phosphine Oxides For High Temperature Transparencies," Polycondensation '98, Annapolis, MD (September 1998).


M. R. Unroe, "A Global Salute to Rigid-Rod Aromatic-Heterocyclic Polymer Chemistry," 31st Central Regional Meeting, American Chemical Society, Columbus, OH (June 1999).


Invention Disclosures and Patents Granted:


Publications (Refereed):


Publications (Unreferenced):


Publications (Submitted):


Presentations, Lectures, Talks (*indicates invited presentation):

* D. S. Dudis, “Quinoidal/Aromatic Transitions in Conjugated Polymers,” University of Toledo, Toledo, OH (November 1998).


D. S. Dudis, A. D. McFarland and A. V. Fratini, “Polyene Excited States: An Ab Initio CI Investigation of the 1A_g and 1B_2 Manifolds,” 39th Sanibel Symposium, St. Augustine, FL (February 1999).


X. Duan and D. S. Dudis, “Structures and Optical Band Gaps of 1,2-Phenylamino Squaraine Polymers” Centennial Meeting of the American Physical Society, Atlanta, GA (March 1999).

X. Duan and D. S. Dudis, “Theoretical Investigation of Electronic Structures and Optical


Inventions Disclosures and Patents Granted:
None

Professional Activities:

Max Alexander, Jr.

D. Dudis
Reviewer for J. Am. Chem. Soc., Inorganica Chimica Acta, Chemistry of Materials, J. Phys. Chem.; Member of PhD Committee (University of Dayton); Chair of ML S&E Computing Advisory Board; Principal Investigator on DoD High Performance Computing Research Project

Robert J. Spry
Adjunct Professor of Physics, Wright State University, Dayton, OH; Wright State University West District Science Day Council and Science Day judge; Reviewer for Applied Physics Letters, Journal of Applied Physics, Journal of Polymer Physics B: Physics Edition, and Journal of the American Chemical Society

Loon-Seng Tan
Reviewer for Macromolecules, Polymer and J. Industrial Chemistry & Engineering

Extended Scientific Visits:
None

APPENDIX B: Off-site Contract and Grant Activities

There were no off-site contracts or grants.
Publications (Refereed):


Publications (Unrefereed):

None

Publications (Submitted):


164


Lectures, Presentations, Talks (*indicates invited presentation):


*R. A. Vaia, "Impact of Mesoscopic Structure on the Behavior of Polymer-Inorganic Nanocomposites," The Ohio State University, Materials Science and Engineering, Columbus, OH (April 1999).

Publications (Refereed):


Publications (Unrefereed):


Publications (Submitted):


Presentations, Lectures, Talks (*indicates invited presentation):


Inventions Disclosures and Patents Granted:

None
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Publications (Submitted):


Lectures, Presentations, Talks (* indicates invited presentation)


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Publications (Unrefereed):


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Publications (Refereed):


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