OFFICE OF NAVAL RESEARCH

FINAL REPORT

SUMMARY/PUBLICATIONS/PRESENTATIONS/STUDENTS REPORT

for

Grant or Contract N00014-91-J-1475
R&T Code 4132056

SOLID STATE NMR STUDIES OF MORPHOLOGY AND ORIENTATION IN POLYMERS

Prof. James F. Haw

Department of Chemistry
Texas A&M University
College Station, TX 77843

Nov 28, 1995

Reproduction in whole, or in part, is permitted for any purpose of the United States Government.

This document is approved for public release and sale: its distribution is unlimited.

19960123 088
Final Report for ONR Grant #N00014-91-J-1475

Summary

Our objective was to provide research training opportunities for graduate students in NMR characterization of polymers, in particular polymers for NLO applications. We collaborated with the Allcock group at Penn State and have a large paper in press in Macromolecules on polyphosphazene NLO polymers. The methodology was to use P-31 and C-13 MAS NMR to study in detail the temperature dependent main-chain and NLO side-group dynamics in two NLO polymers. We studied photochemical cross-linking in host polymer systems and verified the 2+2 mechanism that was central to the original proposal. This was first communicated in Macromolecules, and other work will be forthcoming.

Graduate Students Supported from the Grant

1. Tom Krawietz
2. David Murray
3. Tim Skloss
4. Dodi Heryadi
5. David Ferguson
6. Jinhau Zhang
7. Sharon Taylor-Myers
8. Nicholas Elbaum
9. Jeffrey White
10. Ali Kheir

Publications


Presentations

1. 35th ENC, Pacific Grove, CA., April 1994, "NMR Instrumentation for Probing Chemical Reactions"
2. Society for Applied Spectroscopy, Rice University, January 1994, "New Applications of NMR Spectroscopy"
3. ACS 49th Southwest Regional Meeting, Austin, TX., October 1993, "Characterization of Slow Chromophore Reorientation in Nonlinear Optical Polymers by 2-D NMR"
4. University of Delaware NMR Symposium, Newark, DE, June 1993, "NMR and the Academic-Industrial Interface"
5. NMR User's Association of Brazil 9th Conference, Angra dos Reis, Brazil, May 1993, "Solid State NMR of Materials"


8. Rohm and Haas, Bristol, PA, February 1993, "Characterizing Dynamics of Nonlinear Optical Polymers using Solid-State NMR." (Presented by Ms. Sharon A. Taylor-Myers)

9. Magnetic Resonance Imaging Short Course for Industry, Department of Chemical Engineering, Texas A&M University, November 1992, "Introduction to NMR"

10. Department of Chemistry, Purdue University, October 1992, "Future Directions in Analytical NMR"


12. Office of Naval Research Contractor's Meeting, Naval Research Laboratory, Isle of Palms, SC, April 1992, "NMR of NLO Polymers" (Presented by Ms. Sharon A. Taylor-Myers)

13. Sigma Xi Interdisciplinary Research Workshop, Texas A&M University, College Station, TX, April 1992, "Solid State NMR of Materials"


15. ACS 47th Southwest Regional Meeting, San Antonio, TX, October, 1991, "Characterization of Nonlinear Optical Polymers Using Solid-State NMR" (Presented by Ms. Sharon A. Taylor-Myers)


18. Magnetic Resonance Imaging Short Course for Industry, Department of Chemical Engineering, Texas A&M University, May, 1991, "Introduction to NMR"