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Newsletter of the Georgia Section of the American Chemical Society

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NMR Spectroscopic Investigations of How Polymers under Stress Cope **Dr. Cecil Dybowski, University of Delaware**

Polymers and the materials made from them play a unique role in the modern lifestyle. The chairs we sit in, the cars in which we ride, and many other modern conveniences owe characteristics such as resilience, reduced weight, and structural integrity to the physical and mechanical properties of polymers. The adhesives that hold things together and many of the parts of our own bodies are large molecules made of many repeating units. With the manifold uses of polymeric material, it is essential that we understand the connectivity of the structure and the manner in which they respond to the environments in which they will be used. One crucial characteristic that determines whether a material is useful in certain applications is the manner in which the bulk material deforms under the influence of external forces, whether they be applied by an overweight professor or by the impact of one car against another. In this lecture, I discuss a technique developed in our laboratory based on the NMR spectroscopic properties of these solid materials and their sensitivity to deformation. As an example, we have applied this technique to analysis of the deformation of poly(tetrafluoroethylene) under uniaxial stress. The results demonstrate both the advantages and disadvantages of the NMR technique for the investigation of polymer deformation.

Dr. Cecil Dybowski spent his childhood on a dairy farm near Kenedy, Texas. He attended the University of Texas at Austin (B.S., honors, 1969; Ph.D. in chemical physics, 1973). He was a Research Fellow in Chemical Engineering at the California Institute of Technology with Robert Walton Vaughan. In 1976, he became an assistant professor of chemistry at the University of Delaware, where he is currently a professor. He has authored over 130 research papers and co-authored 2 books, including *Transient Techniques in the Solids NMR of Solids* (with B.C. Gerstein), and *NMR Spectroscopy Techniques* (with R.L. Lichter). He serves on the editorial boards of *Solid State Nuclear Magnetic Resonance*, *Magnetic Resonance Reviews* and *Applied Spectroscopy* and is associate editor of *Applied Spectroscopy* and section editor of the *Encyclopedia of Analytical Chemistry*. His research interests include: (1) solid state NMR; (2) heterogeneous catalysis; (3) polymer physical structure; and (4) minerals and solids. He has been a visiting scientist at the DuPont Company (1982), visiting professor of chemical engineering at the University of California at Berkeley (1998), professeur associe in the Laboratoire de Chimie des Surfaces at the Universite Pierre et Marie Curie (France), distinguished visit-

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Monday, November 6th, at Georgia Tech



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ing Professor at the Jagiellonian University (Krakow, Poland), the S. P. McElvain Lecturer in the Analytical Chemistry at the University of Wisconsin at Madison (1984), and the Delaware Valley Section of the Society for Applied Spectroscopy's Spectroscopist of the Year (1984).

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Monday, November 6th, at Georgia Tech

NMR Spectroscopic Investigations of How Polymers under Stress Cope **Cecil Dybowski, Ph.D**

Date: Monday, November 6, 2000

Time: 6:30 - 7:00 p.m. arrive & social
7:00 - 7:30 p.m. dinner
7:30 - 9:00 p.m. Speaker

Dinner: "South of the Border" Tortilla Chips with Black Bean Jicama Salad, Roasted Pepper Salad topped with Pine Nuts, Prepared Beef or Chicken Fajitas with sautéed Onion and Mixed Peppers, Diced Tomatoes, Sour Cream and Green Onions, Flour Tortillas, Cilantro Fried Rice, Mexican Corn, Cinnamon Tortilla Chips, Iced Tea or coffee
The food will be served buffet-style in the atrium of the IBB building, and the meeting will be held in the conference room adjacent to the atrium.

Location: Georgia Tech
Petite Institute for Bioengineering and Biosciences
315 Ferst Drive
Atlanta, GA

Directions: Exit at the Techwood/10th/14th exit, go west on 10th street to State Street, turn L onto State, go to the stop sign, turn L onto Ferst. The Bioscience building is one block east on the corner of Ferst and Atlantic. Parking is free and available anywhere around the building or nearby parking lots.

Cost: \$15 per person, full-time students with ID and high school teachers, \$5. Payment should be made to the ACS Georgia Section and will be collected at the door.

RSVP: Katherine Seley, 404-894-4013,
<katherine.seley@chemistry.gatech.edu>
When making reservations, please state your name and telephone number. Reservation deadline is 5:00 PM on the Wednesday preceding the meeting (November 1). If you make a dinner reservation but fail to attend, you must still make payment for your meal to treasurer Angus Wilkinson, School of Chemistry and Biochemistry, Georgia Institute of Technology, Atlanta, Georgia 30332-0400, (404) 894-7452.



2000-01 Georgia Section Meetings:

December, 2000
no meeting

January, 2001
TBA

February, 2001
Boron: Its Not Just for Rocket
Fuel Anymore
Thomas Holme

March, 2001
Is It Chemistry or Magic? An
Insider Look at a Chemical
Demonstration Road Show
James Webb & Otis
Rothenberger

April, 2001
TBA

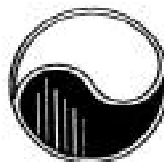
May, 2001
Herty Award dinner

September, 2001
The Chemistry of Wine
Ernie Simpso

November, 2001
Chemistry in the Sherlock
Holmes Stories
James O'Brien

Analytical Consulting
Automation/Networking

GC/MS/DS & UPS
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