

Thursday 20 May 2010

POLYMER PHYSICS AND POLYMER CHEMISTRY: WHY DO POLYMERS BEHAVE DIFFERENTLY FROM OTHER MATERIALS AND FROM EACH OTHER

Dr. Alan Tonelli

North Carolina State University

We seek an understanding of the unique properties exhibited by materials made from polymers, because of their high molecular weights and long-chain natures. Among these are rubber-like elasticity, time-dependent flow and mechanical properties, and two-phase crystalline and amorphous morphologies. All polymers, regardless of the detailed chemical structures of their repeat units, can exhibit such behaviors which distinguish them from atomic and small-molecule materials. Their long chains permit polymers to assume an almost limitless number of conformations and overall sizes and shapes via facile backbone bond rotations, thus giving them an internal degree of freedom to respond to stresses or their environment. This internal or intra-chain degree of freedom is unavailable to small-molecule or atomic materials, and results in the unique behaviors of polymers, which we call polymer physics. On the other hand, the wide range of behaviors exhibited by different polymers is termed polymer chemistry, because of their chemically distinct repeat units or microstructures. By taking account of the detailed microstructures of polymers, since these govern their backbone rotations, conformations, and overall sizes and shapes, their internal responses to stresses and their environments, ie., their properties, can be both understood and distinguished from one another.

6:00-6:30 pm Social Hour Conference South

6:30-7:30 pm Dinner Conference South

7:30-8:30 pm Presentation Conference South

Oklahoma State University – Oklahoma City, Student Center 3rd Floor, Conference South

900 N. Portland Ave, Oklahoma City, OK 73107

map: <http://www.osuokc.edu/map/default.aspx>

Menu

Honey Baked Ham
Southern Fried Chicken
Garlic Mashed Potatoes
Green Beans Almandine
Snow Peas & Carrots
Garden Salad
Peach Cobbler

Cost

\$20 members
\$5 students

RSVP Deadline

Friday, May 14th, 5 pm
Contact: Sherri Tsoodle
405-945-9112

stsoodl@osuokc.edu

RSVP is NOT required to attend the presentation.

Dr. Alan Tonelli Biographical Sketch

B.S. in Chemical Engineering from the University of Kansas in 1964 and a Ph.D. in Polymer Chemistry from Stanford in 1968, where he was associated with the late Professor Paul J. Flory. He was a member of the Polymer Chemistry Research Department at AT&T Bell Laboratories, Murray Hill, N.J. for 23 years, and in 1991 joined the Fiber and Polymer Science Program in the College of Textiles at North Carolina State University in Raleigh.