

Chemistry Research Heats Up

Thanks to an award from the National Research Council, Stan Anderson is conducting promising research in polymers.

Chemistry Professor Stan Anderson has received a prestigious National Research Council Senior Research Associateship award. As a result, he is spending an additional semester on sabbatical, conducting studies at UC Santa Barbara with Michael T. Bowers, a professor in the chemistry department. He is also working with scientists at Edwards Air Force Base.

"The new silicon polymer materials we are studying have special properties for use in high-temperature environments and in space vehicle applications," Anderson says. In the research world, the associateship is the equivalent of a Fulbright grant.

The Air Force Office of Scientific Research (AFOSR) and Air Force Research Laboratory's Propulsion Directorate at Edwards Air Force Base sponsor and specifically fund the associateship, which is an internationally competitive award. Each year about 800 scientists and engineers participate in the national program through the National Research Council of the National Academy of Sciences. Senior doctoral-level scientists such as Anderson receive 200 of the overall awards.

Anderson and Bowers collaborate on research that analyzes molecular structures using ion chromatography/mass spectrometry techniques

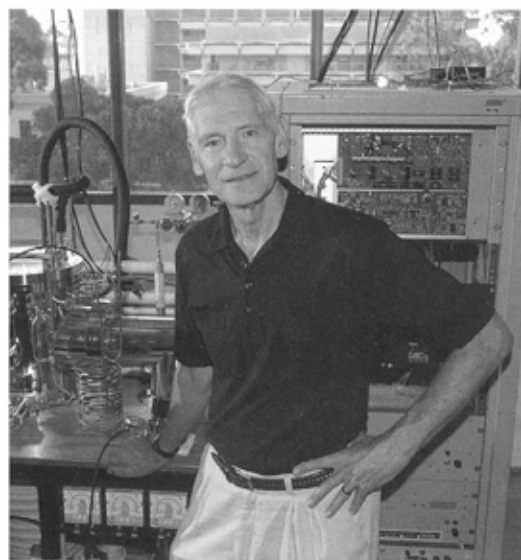
perfected by the Bowers Group. This procedure separates molecules by size and shape and provides a comparison to theoretically calculated structures.

Using this technique, Anderson examines small amounts of POSS (polyhedral oligomeric silsesquioxane), monomers that can be used as building blocks of special, high-performance polymers. The research should show the complex shapes of this family of polymers on a molecular level for the first time, providing greater understanding of their material attributes.

POSS technology is an exciting new area of material science. A super-plastic or polymer that is silicon based, it has ceramic-like material characteristics that provide thermal stability, flame retardation, abrasion resistance, and greater strength to a large family of plastics.

Anderson's study of the nano-scale structure of POSS will help explain the unusual reinforcement or strength that these molecules demonstrate. It will also perfect the computational methods used to analyze the shape of POSS molecules, providing evidence that POSS is a complex nano-structure rather than a simple spherical unit.

This research and collaboration has led to three papers that Anderson co-authored about this work published in the *International Journal of Mass Spectrometry*. He has also presented papers and seminars at the Lake Arrowhead Conference on Ion Chemistry, at CSU



Fullerton and at Edwards AFB.

After a year-long sabbatical (extended by the associateship), Anderson is looking forward to being back at Westmont. He will present his research in a Phi Kappa Phi lecture on campus this spring.

Anderson joined the Westmont chemistry department in 1978. He earned his undergraduate degree in chemistry with honors at Wheaton College in Illinois and his doctorate in inorganic and physical chemistry at the University of Illinois, Urbana. In addition to teaching, Anderson has received research grants from AFOSR, American Chemical Society, Petroleum Research Fund, Research Corporation, and National Science Foundation during his scientific career. He has published a diverse series of papers with his students on organometallic chemistry, electrochemistry, nuclear magnetic resonance of solid materials, and atmospheric chemistry.