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Materials and Bioengineering Section
Pharmaceuticals and Bioengineering Department
Chemistry and Chemical Engineering Division

Ph.D., Polymer Science, University of Akron, 2005
B.S., Chemistry, Texas State University, 1999

Dr. Rubal performs formulation, synthesis, characterization, and analysis of polymer systems at SwRI. His recent formulation work has included cyclic olefin blends, fire retardant rubbers, antimicrobial thermoplastics, epoxy composites, and drug releasing silicones. Recent synthesis work included photo-free radical graft polymerizations, polyimide condensation polymerizations, monomer synthesis, and anionic ring opening polymerizations. In addition, recent characterization work has included analysis of components by differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), nuclear magnetic resonance (NMR) spectroscopy, ultraviolet-visible (UV-Vis) spectroscopy, Fourier transform infrared (FTIR) spectroscopy, optical microscopy, titration, and the analysis of gasses by electrochemical cells. Topics of interest include hydrogel applications, novel antimicrobial releasing materials, gas separation membranes, ion transport membranes, and medical device method development and testing.

Dr. Rubal completed his postdoctoral studies at Texas State University on polyimide gas permeation membranes which included incorporation of nanocomposites and the synthesis of hyperbranched architectures. During this period, he also taught second-year organic chemistry.

As a graduate student at the University of Akron, Dr. Rubal studied the structure-property relationships associated with the length of the flexible spacer group on laterally attached side-chain liquid crystalline polymers. By synthesis of a series of model compounds and monomers, as well as the controlled ring-opening metathesis polymerization of the monomers, clear thermotropic and liquid crystalline properties were established for the various spacer lengths. Furthermore, enantiospecific reductions were completed and incorporated into the polymer systems. As an undergraduate at Texas State University, Dr. Rubal became familiar with supercritical fluids and interpenetrating networks.

PROFESSIONAL CHRONOLOGY: Texas State University: postdoctoral associate, 2005-6; Southwest Research Institute: 2006-[research scientist, 2006-10; senior research scientist, 2010-15; group leader, 2015-16; group leader (acting manager), 2016-present].

MEMBERSHIP: American Chemical Society (Polymer Division)

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Abstract

Southwest Research Institute: Advanced Science. Applied Technology.

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Presenter

Michael Rubal, PhD

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Southwest Research Institute

Southwest Research Institute® (SwRI®), headquartered in San Antonio, Texas, is one of the oldest and largest independent, nonprofit, applied research and development organizations in the United States. SwRI's technical divisions offer a wide range of technical expertise and services in such areas as chemistry, space science, nondestructive evaluation, automation, engine design, mechanical engineering, electronics and more. The Institute occupies more than 1,200 acres and provides more than 2 million square feet of laboratories, test facilities, workshops, and offices. In 2016, SwRI sponsored more than \$7.4 million in internal research to develop innovative technologies that ultimately benefit clients.

The technical talk will include a brief overview on SwRI, what makes this organization unique, and the general ways in which SwRI operates. Highlighted within the presentation will be examples of projects from across the institute with an emphasis on recent projects conducted by the Materials and Bioengineering Section.