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Shantz earned his B.S. and Ph.D. degrees in chemical engineering from the University of Florida and the University of Delaware, respectively. Upon completing his Ph.D., he spent 18 months at the Max-Planck-Institute for Coal Research in Germany as an Alexander von Humboldt postdoctoral fellow before joining the faculty of Texas A&M in 2001. Shantz was promoted to associate professor in 2006 and is currently the William and Ruth Neely Faculty Fellow in Chemical Engineering and the Associate Department Head for Graduate Programs. The Shantz Lab focuses on the synthesis, characterization, and testing of porous materials. The two current research themes of the lab are developing structure property relationships as they relate to zeolite growth and zeolite composition, and designing new organic-inorganic hybrid materials for separations and catalysis.

“Engineering Nanospaces: Designing Organic-Inorganic Hybrid Materials”

The ability to rationally design organic-inorganic hybrid materials will have technological implications for fields as diverse as heterogeneous catalysis, separations, and biotechnology. This talk will summarize my lab’s effort in the area of hybrid materials and cover three separate, yet related topics. The first is the synthesis and characterization of ordered mesoporous silica (OMS) – organic hybrid powders, emphasizing both our fundamental work characterizing these materials and some investigations of their catalytic properties. The second is the application of dendrimer-functionalized alumina membranes for gas separations. This topic builds off the first, developing hybrid membranes for gas separations that display superior properties. Nitrogen/propane permeation studies show the hybrid membranes have propane selectivities in the best instances between 50 and 70, a factor of three higher than the current industrial standard, polydimethylsiloxane (PDMS). The key to obtaining these selectivities will be highlighted. The third part of the talk will focus on recent studies of hybrid membranes in the context of liquid separations and microfiltration. Both fouling studies and preliminary competitive binding studies will be presented.