Alan Allgeier

Associate Professor

Chemical and Petroleum Engineering

Dr. Alan Allgeier earned his B.S. in Chemistry at Case Western Reserve University in 1992 and defended his Ph.D. in Inorganic Chemistry in 1996 at Northwestern University under the guidance of Prof. Chad A. Mirkin. He has split his professional career between the pharmaceutical industry (Amgen, Inc) and the chemical industry (DuPont), garnering significant expertise in catalysis and process chemistry. From 2011 – August 2017 he led a laboratory in the Surface and Particle Science group at DuPont with responsibility for characterization of particle systems and porous materials, including catalysts. Dr. Allgeier has authored 22 journal articles, is co-inventor on 26 patents, and has served as guest editor for Topics in Catalysis and as chair of the Organic Reactions Catalysis Society and the Catalysis Club of Philadelphia. He has been honored with the inaugural Amgen Green Chemistry Award (2011) and the Russell Malz Award for Service in Catalysis (2014).

"Challenges in the Characterization of Industrially-Relevant Porous Materials"

Abstract

Industrially significant materials ranging from membranes to catalysts and from fibers to solid dose formulations derive performance from their porous structures. This presentation will describe porous material characterization techniques including gas adsorption, X-ray computed tomography (CT) and low-field nuclear magnetic relaxometry. More importantly it will describe application of these techniques to two significant industrial problems: the development of silica aerogel insulation products and the characterization of polyamide pulp dispersions. In the former case, the influence of compression on pore structure will be explored using a combination of nitrogen adsorption porosimetry and X-ray CT. Correlations between pore structure and thermal conductivity will be described in light of product optimization. For the case of polymer particle dispersions, traditional gas adsorption techniques are insufficient to elucidate the structure of a wetted material, which may collapse during sample vacuum preparation steps. To address this limitation of conventional porosimetry we are developing low-field NMR methods to characterize materials under conditions of use, e.g. as a wetted slurry. The physical basis for these methods and example data sets will be discussed to underscore the value of low-field NMR for challenging characterization problems.

Thursday, October 26th, 2017 | 11:00 – 11:50AM

2 Eaton Hall (Spahr Auditorium)