Mark A. McHugh, Ph.D.

Professor Emeritus, Chemical and Life Science Engineering at VCU College of Engineering
Richmond, VA, US

Professor McHugh researches high-pressure fluid properties and phase equilibria

Biography

Dr. McHugh earned his Ph.D. in Chemical Engineering from the University of Delaware in 1981. He is currently a Professor Emeritus of Chemical Engineering at Virginia Commonwealth University (VCU). He was an Assistant Professor in the Chemical Engineering Department at the University of Notre Dame from 1981 till June 1985 and an Assistant Professor, Associate Professor, and Professor at the Johns Hopkins University from July 1985 till August 1999. His research group has exploited the underlying physics and chemistry of supercritical fluid (SCF)-assisted technologies to create materials with unique morphology and function not attainable by other means. His group utilizes high-pressure, high-temperature (HPHT) techniques and an experimental design to reveal fundamental solution property information at a molecular level. His group has coupled HPHT solution techniques with dynamic light scattering and small angle neutron scattering techniques to modulate and identify molecular interactions between the components in solution at extreme operating conditions. The group utilizes a design protocol that systematically varies both the molecular structure of the SCF solvent and the solute of interest. The information generated in this research provides a stringent test of contemporary solution theories and computer simulations developed to predict phase behavior and other fluid properties. During his career, he has secured approximately $4.5 million of corporate funding and approximately $4 million of government funding for his research program. He has graduated 13 PhD students and 19 MS students and has had four visiting foreign faculty colleagues work in his laboratories. He has mentored more than 12 Postdoctoral Research Associates, several of which who have gone on to successful academic careers. He currently has published more than 150 peer-reviewed manuscripts, one book, and he has been awarded seven patents. Professor McHugh was awarded Emeritus status in February 2015, although he maintains a fully operational laboratory in the Chemical and Life Science Engineering (CLSE) Department staffed with a full-time Research Professor and a PhD graduate student all supported with external funds. His current research interests are the measurement and prediction of fluid viscosity, density, phase behavior, interfacial tension, and thermal properties at extreme operating conditions up to 3,000 bar and 300 °C.

Industry Expertise

Education/Learning, Research

Areas of Expertise

High-Pressure Fluid Properties and Phase Equilibria, Polymer Solution Behavior at High Pressures, Scattering Phenomena in Polymer Solutions at High Pressures, Supercritical Fluid Solvent Technology

Affiliations

American Chemical Society : Polymers Material Science & Engineering Division, American Chemical Society : Polymer Chemistry Division, American Physical Society : High Polymer Physics, Journal of Supercritical Fluids : Editorial Advisory Board

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Education

University of Delaware
Ph.D. Chemical Engineering

Carnegie-Mellon University
B.S. Chemical Engineering

Accomplishments

Finalist for the 2014 Institution of Chemical Engineers Global Awards,
Core Chemical Engineering Category; Team Members: Isaac Gamwo (ORD), Robert Enick (NETL-RUA), Mark M c Hugh (VCU), Deepak Tapriyal (URS), and Ward Burgess (ORISE)

Distinguished Scholarship Award, August 2014
Virginia Commonwealth University

Faculty Excellence Award for Teaching in Chemical and Life Science Engineering
Engineering Student Council

Visiting Professor, Lehrstuhl für Thermische Verfahrenstechnik
Friedrich-Alexander- University, Erlangen-Nuremberg, May-Dec. 2007

Kipping Visiting Professor
Chemistry Department, University of Nottingham, March 1996
