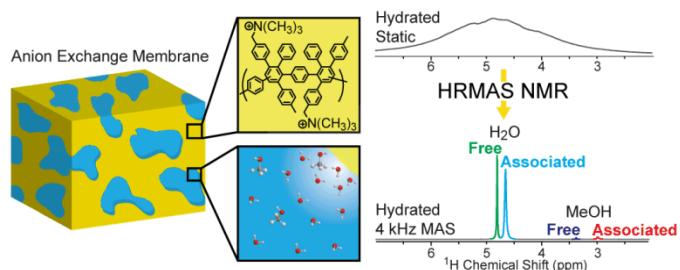


HRMAS NMR PFG: A new tool to study heterogeneous diffusion in fuel cell polymer membranes

Todd M. Alam, PMTS

Department of Electronic, Optical and Nano Materials, Sandia National Laboratories, Albuquerque, NM 87185

Determination of local chemistry and transport properties in hydrogen and methanol fuel cell membranes is crucial for predicting and optimizing performance. By combining High Resolution Magic Angle Spinning (HRMAS) NMR and Pulse Field Gradient (PFG) diffusion experiments it is demonstrated that different environments in alkaline fuel cell polymer membranes could be resolved. These HRMAS experiments clearly reveal the heterogeneous nature of solvent-membrane interactions and “open the door” to measuring local equilibrium constants, diffusion, and exchange rates in mixed solvent systems. Examples comparing different membranes will be presented.



Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

This work is being presented at Dept. of Chemistry, ASU, Tempe AZ.