Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Neutron Reflectometry Measurements of the Depth Profile of Water in a Fuel Cell Membrane. JOSEPH DURA, CHARLES MAJKRZAK, SUSHIL SATIJA, NORMAN BERK, Center for Neutron Research, NIST, Gaithersburg, MD 20899 , JON OWEJAN, THOMAS TRABOLD, General Motors Corporation, Fuel Cell Activities, Honeoye Falls, NY 14472 — Specular neutron reflectometry (NR) measurements have been performed on a prototypical polymer electrolyte membrane (PEM) for fuel cell application, e.g., Nafion. The samples were formed by spin coating onto a variety of substrates, and annealing in vacuum. The measurements are designed to reveal the water distribution across the thickness of the membrane material, as a function of relative humidity and for the case in which the film is in contact with a liquid water reservoir. Data from several samples indicates how the water profile for a given humidity changes with annealing temperature of the polymer film. Finally, we consider the application of phase-sensitive methods to eliminate potential ambiguity in the scattering length density profile of the membrane obtained from NR.

Joseph Dura
Center for Neutron Research, NIST, Gaithersburg, MD 20899

Date submitted: 30 Nov 2005 Electronic form version 1.4