

Abstract Submitted
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Structure and Dynamics of Proton-Conducting Azoles Confined within Metal-Organic Frameworks JAMIE FORD, University of Pennsylvania, JASON SIMMONS, NIST Center for Neutron Research, TANER YILDIRIM, University of Pennsylvania/NIST Center for Neutron Research — Efficient polymer electrolyte membrane (PEM) fuel cells are one of the most promising candidates to power our vehicles of the future. Hydrated sulfonated polymers are currently the preferred membrane material because of their excellent conductivity and gas diffusion characteristics. The intrinsic water dependence in these systems limits the operating temperature to 100 C, leading to reduced electrode kinetics and increased CO poisoning. If water can be replaced by a small molecule with a higher boiling point, the overall efficiency of the system can be improved. To this end, we have investigated a set of new host/guest materials based on metal-organic frameworks (MOFs) loaded with a variety of azoles. The thermally and chemically stable frameworks provide a well-defined porous structure that accommodates the proton conduction pathways formed by the azole networks. We will present the structure of the azole networks as well as insight into the proton motion dynamics as a result of a variety of neutron scattering experiments.

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