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Drainage in Gas diffusion Layers of PEM fuel cells EZEQUIEL MEDICI, JEFF ALLEN, Michigan Technological University — Percolation through porous transport layers (PTL) of proton exchange membrane (PEM) fuel cells have distinct fluid flow patterns depending on the PTL morphological and wetting properties as well as injected/displaced fluid properties and flow rates. These distinct fluid flow patterns include stable displacement, capillary fingering, and viscous fingering. A pseudo Hele-Shaw cell experimental setup was developed to effectively characterize different gas diffusion layers based on their susceptibility to the formation of these fluid flow patterns. The wetted area is determined by tracking the injected fluid from a top view of the cell. The percolation pressure is measured at the injection location of the cell. These two outputs are essential to identify the mechanism controlling the percolation process. The goal of this work is to link the wetted area and percolation pressure through non-dimensionalization that collapses these onto a single curve. Preliminary results from capillary fingering and stable displacement data show a constant shift between the curves for different PTL samples. This allows for unique characterization of PTLs based on their morphological and wettability properties.

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