Numerical analysis of proton exchange membrane fuel cell using the binary friction model

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A two-dimensional, computational fluid dynamics (CFD) model of proton exchange membrane fuel cell (PEMFC) was performed by taking into account liquid water transport through the membrane electrode-assembly, including electro-osmotic drag, back diffusion, water generation. The modified binary friction model (BFM) was considered to explain the complex relation between proton conductivity and water content through polymeric membrane. The presented model was validated with cell polarization data taken from literature. Also, the resulting data was compared with conventional conductivity and water transport model.