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## Comparing predictions of PEM fuel cell behavior using Maxwell-Stefan and CFD approximation equations

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This study examines the accuracy of solving the multi-component equations for a Proton Exchange Membrane Fuel Cell (PEMFC) by using a Computational Fluid Dynamics (CFD) technique. This technique uses an approximated multi-component (AMC) model with a correction term that guarantees the overall mass balance. Accuracy is assessed by comparing the species concentration computed with the Maxwell-Stefan and the corrected AMC models. This comparison is important because the structure of some CFD programs does not permit the direct use of the Maxwell-Stefan equations and this leads to confusion in the literature and to implications that CFD predictions are not accurate because a different set of transport equations and mixture diffusion coefficients are used. Here, it is shown that this controversy is ill-founded because the maximum error between the two models is less than 5%. Thus, the use of the corrected AMC model is appropriate for PEMFC applications.

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