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NUMERICAL MODEL OF DROPLET DYNAMICS ON THE GDL SURFACE OF A PEM FUEL CELL CATHODE

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The present work proposes a model for a water droplet emerging from a pore in a gas channel of a polymer electrolite membrane (PEM) fuel cell. While typically this kind of problem is modelled using the volume of fluid (VOF) model, a Lagrangian multi-flow model is developed here. The model takes into account the surface tension since is the key force for the correct prediction of the droplet deformation and detachment. The numerical results are compared with the results from the analytical model previously developed by the author. This work is the first step in the full implementation of a fuel cell model. By knowing the area of the channel surface covered by the water, the oxygen mass flow can be computed and used as an input for a model of the fuel cell.