عنوان مقاله:

An analytic model of membrane humidifier for proton exchange membrane fuel cell

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خلاصه مقاله:

An essential requirement for an operating PEM fuel cell is providing proper water content in the membrane. To avoid water flooding an appropriate water balance isrequired. Here, an analytic model of a planar membrane humidifier for PEM fuel cell is proposed where the effect of dimensional parameters includes membranethickness, membrane area and channel hydraulic diameter are investigated. A Nonlinear governing equations system is developed and solved. At each stage, the outlet temperatures, the water and heat transfer rates, relative humidity and the dew point at dry side outlet are presented and discussed. The humidifier is evaluatedbased on the decrease in difference between the dew point at wet side inlet and dry side outlet which leads to humidifier better performance. The results show that an increase in membrane thickness results in a decrease in dew point at dry side outletwhich indicates a weak humidifier performance. Vaster membrane area can enhance humidifier performance. Here, big hydraulic diameters are not recommended.

کلمات کلیدی:

Dew point, Dimensional parameters, PEM fuel cell, Planar membrane humidifier

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