# Modeling of a membrane module in a pervaporation process for concentration of hydrogen peroxide

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A hydrogen peroxide concentration process such as patented by NASA has been modeled in this work. The process consists of a shell and membrane tubes, where a liquid hydrogen peroxide solution flows in the shell, and a sweep gas flows in the tubes countercurrent to each other. The liquid is concentrated as more water molecules permeate and evaporate through the membrane than hydrogen peroxide. For this process, a mathematical model has been developed based on mass and energy balances for the membrane module, a sorption–diffusion mechanism for permeation, and an Arrhenius relationship for the temperature dependency of the permeate flux. The dynamic behaviors of the concentration and the temperature of hydrogen peroxide product in the retentate side are estimated by solving partial differential algebraic equations in this model. The model predictions are to be compared with the experimental results reported by NASA.