Simulation of a molten carbonate fuel cell (MCFC) system with direct internal reforming

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A molten carbonate fuel cell (MCFC) system with direct internal reforming is introduced. At first, MCFC system is simulated in steady state using the Aspen-Plus. In steady state simulation, to simplify the stack model, anode and cathode channel is assumed reactors. Reforming reaction, catalytic combustion, anode and cathode recycle, heat exchange was considered. And to consider the internal reforming influence, heat flow between the unit models is added. In dynamic simulation, stack is programmed by Matlab. From the dynamic simulation, the quantitative response of the system to several disturbances will be obtained and will be used to design control system and the process design.