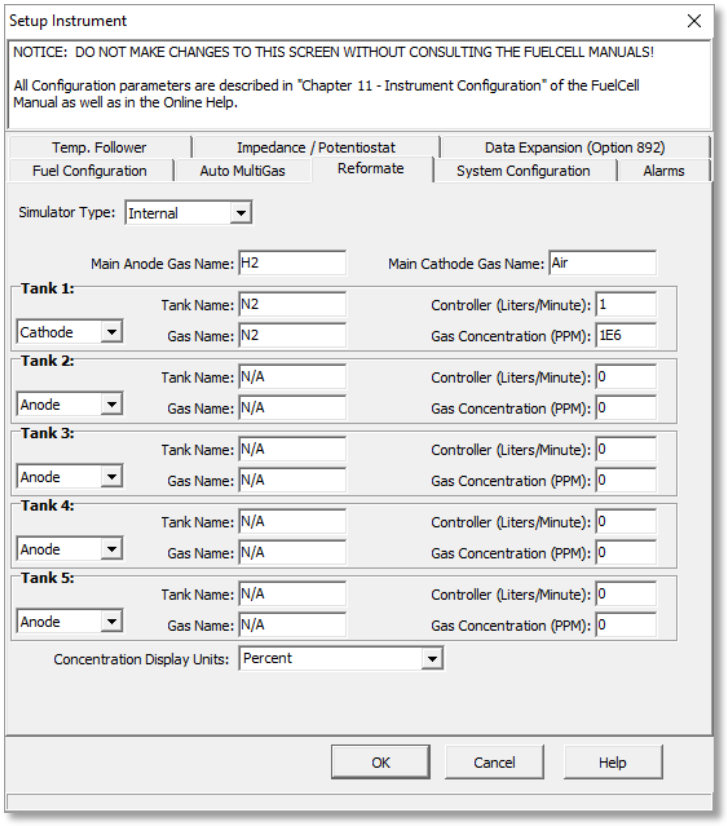
FuelCell Addendum – Reformate and Gas Mixing Setup

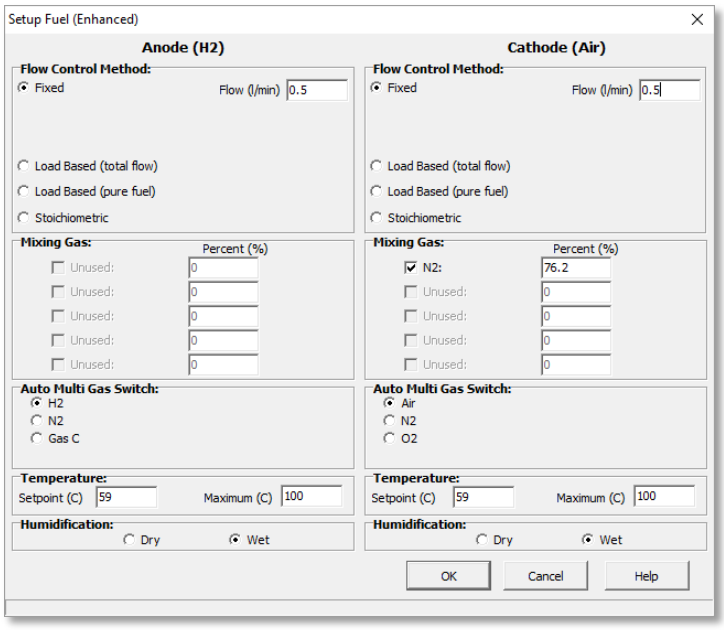
Q: Can I setup my Scribner fuel cell test system (850/855/890) and FuelCell software for gas mixing? I want make mixtures of different oxygen (O_2) and nitrogen (N_2) concentration for mass transport limiting experiments.

A: The FuelCell software manual has information on setting up gas mixing under the heading "Reformate Simulation". There is a "Reformate" tab in the Instrument Configuration menu. This is where you setup FuelCell for additional mass flow controllers, gas type and concentration for gas mixing. Once the Reformate tab is configured, the Setup Fuel menu will now show the additional available gases.

In this example, the main cathode gas is Air (21% O_2 + 79% N_2) and there an additional 1 SLM flow controller connected to a tank of pure N_2 (1E6 PPM concentration). The Simulator Type is set to Internal. For this application it is helpful to set the Concentration Display Units to Percent.

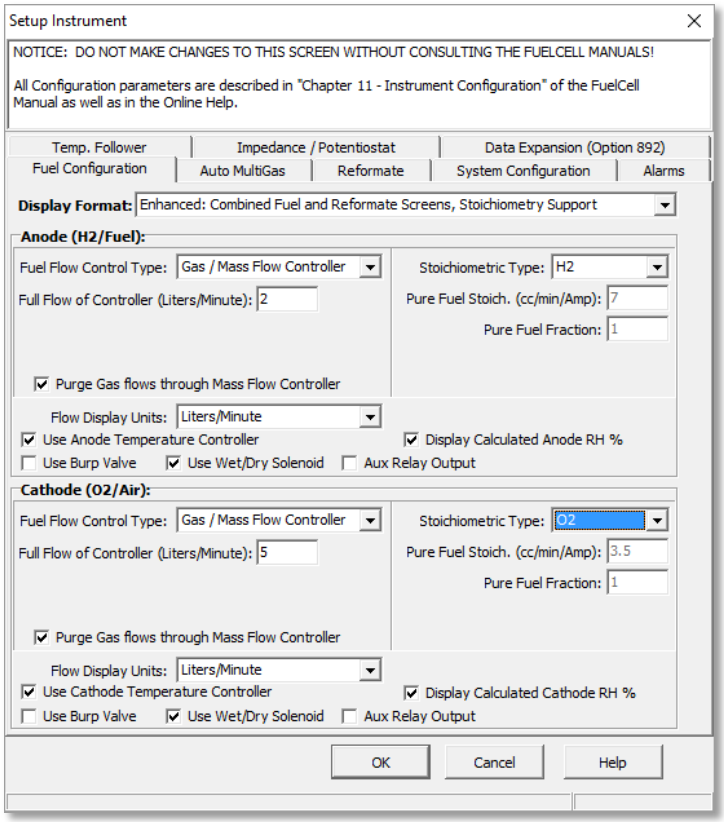


For a final gas mix of 5% O2, the Air needs to be diluted by a factor of 4.2x (= 21% / 5%). The fraction of pure N2 flow is then 76.2%:



The FuelCell software will take care of the rest. It also works in load-based and stoichiometric flow rate controlled mode. FuelCell will vary the proportion of Air and pure N_2 to get the final desired concentration of O_2.

Note that if the main cathode gas is pure O_2 and not Air than you must configure FuelCell for O_2 in the Fuel Configuration menu:



If O2 were the main cathode gas, than the N2 mixing gas percent would be 95%: