

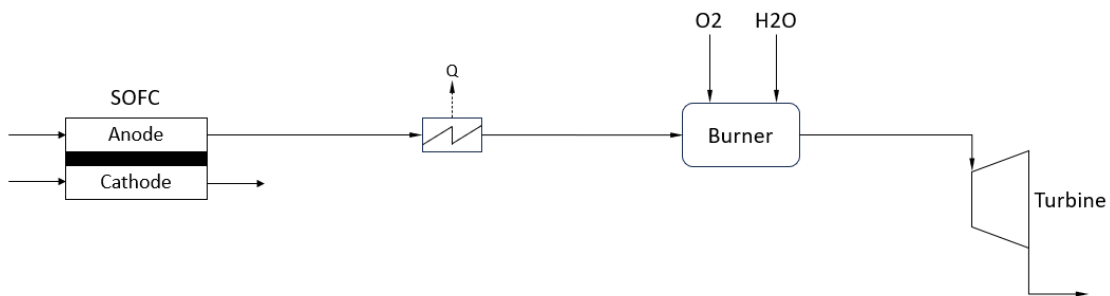
Design and modelling of a combustion chamber with oxygen and water injection

Supervisor: Martin Gay

Prof: Jan Van Herle

Project description:

To increase electric power production, a micro gas turbine is coupled to the outlet of a SOFC, expanding the outlet gases. As the fuel is not fully consumed in the fuel cell, the leftovers are burned to increase the temperature. The anode off gas of the fuel cell is only composed of CO, CO₂, H₂ and H₂O. By burning these gases with an addition of O₂, the products are only H₂O and CO₂. The problem is that the temperature of the gases is too high regarding the thermal properties of the combustion chamber and the micro gas turbine. For this purpose, water in liquid and steam form is injected in the combustion chamber to lower and regulate the outlet temperature. The combustion could occur with a flame or not. The goal is to model a combustion chamber allowing to inject O₂ and water. Then the flammability limits will be investigated to define the working range according to the anode off gas, the O₂ and water injection. The modelling will be performed with ANSYS.



Your tasks:

- Design an oxy-combustion chamber with water injection
- Model the combustion regarding the inlet gas and the gases injection
- Define the working conditions (flammability limits)

A background with ANSYS is recommended.

Administrative:

The project will be supervised by Martin Gay (GEM). If interested, please send a short motivation letter, to Martin.

Location:

This research work will be conducted at EPFL-Sion, or remotely.

Contact:

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