Project title – Mini-Astérix : TSA vs VTSA

Context:

The technology developed at the EPFL Carbon team is based on a hybrid technology setup, with a first stage of adsorbents, and a second stage composed of a graphene membrane setup. The adsorbents are use in a low energy Temperature Swing Adsorption (TSA) process which allows us to concentrate CO2 from 0.04% in the atmosphere to 1%. This enriched feed is then passed onto the membrane stage for further purification up to 95%.

The disposition of the adsorbents used in the TSA phase are essential for the efficiency of the system. This can come through the shaping of the adsorbents, as well as the shape of the unit that contains them. This drastically affects the pressure drop of the system, which yields higher energy consumption.

Description:

You will have at your disposition a modular characterization unit which a previous student team has developed. You will be able to change the array of sensors, build your own adsorbent housing units, and test the setup's efficiency in terms of pressure drop. In the case of the Carbon Team, the LFIM is currently working on the scaling up of the adsorbent processes. The results of your work will strongly influence the direction in which this research is led.

Requirements:

- Some knowledge in mechanical engineering, thermodynamics & fluid mechanics
- Electronic circuit design, Arduino Pyton
- Knowledge in adsorbents shaping and performance
-Remarks: Independence and good communication would be also greatly appreciated

Contact:

If you are interested or have an more questions, send us an email at contact@epflcarbonteam.ch -> We'll get back to you as soon as possible!

Remarks:

You will work in close collaboration with the Chemistry team of the EPFL Carbon team and the previous members that built the mini prototype, as to choose adequate commercial adsorbents and accelerate your development phase. You will also be

working on the mini unit at the same time as other students, so modifications you have in mind could be made in collaboration with them !

Useful works: Work done by Basile Farkhoury on the simulation of cylindrical sorbent beds pressure drop. Also the work done By Nicola Zali