LABORATORY FOR CHEMICAL TECHNOLOGY
Technologiepark 125, 9052 Gent, Belgium

Coach	**Supervisor(s)**	**Funding**
Ir. Klaus Jacobs	Prof. Dr. Ir. Joris Thybaut Dr. Ir. Soroush Zareghorbaei	Be-HyStore

H_2S removal from H_2 enriched natural gas: experimental assessment

Aim

Experimental evaluation of the reactive adsorption of H_2S from H_2 enriched natural gas on activated carbon at a wide range of operating conditions.

Justification

The removal of H_2S from natural gas through a reactive adsorption is an already proven technology which is currently being used in the industry. In the presence of air, H_2S dissociates into H_2O and elemental sulphur. The latter stays adsorbed on the active carbon material. As a consequence, the active carbon needs to be replaced upon saturation.

The upcoming energy transition involves using evermore H_2, which brings new challenges for this technology as it is planned to initially inject H_2 (5 to 10%) and up to 100% H_2 into natural gas reservoirs. Hence, although the technology has been proven successful, it has yet to be demonstrated in a H_2 rich environment. Due to the reasons mentioned before, a custom-made set-up (REMGAS) within LCT has been built which handles model molecules as well as real feedstock. Different types of activated carbon are available with different properties, either in physical appearance (powder, granular, extrudates) or chemically (carbon black, graphitic,…). Activated Carbons will be acquired for physico-chemical characterization and performance testing.

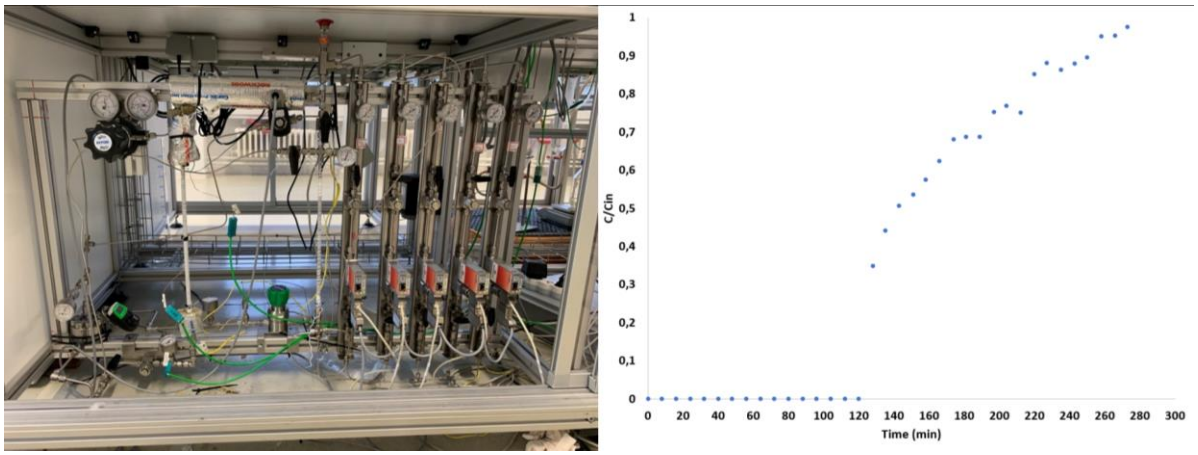

Figure 1 Left: REMGAS set-up, Right: Relative H_2S concentration as a function of time

Program

1. Literature review on selective catalytic reactive adsorption of H_2S on active carbon.
2. Physico-chemical characterization of the different activated carbons.
3. Experimental assessment on the reactive adsorption of H_2S on active carbon under a H_2 rich environment using model compounds: N_2, CH_4, H_2O, H_2S, H_2 and air.

[1] H. L. Chiang, J. H. Tsai, G. M. Chang and Y. C. Hsu, “Adsorption Kinetic Characteristics of H2S on Activated Carbon” *Adsorption*, vol. 8, no. 4, pp. 325-340, Dec. 2002, doi: 10.1023/A:1021537530695

GHENT UNIVERSITY
LCT DRIVING CHEMICAL TECHNOLOGY