sulfur

Biological desulfurization processing schemes

Type of Project: BSc/MSc Thesis or internship

Starting Date: January 1, 2023 or later

Duration: 5 - 6 months

Salary: €200/month (not including Erasmus participants)

Location: Wetsus – European centre of excellence for sustainable water technology - Leeuwarden, Netherlands

Project Description:

Currently, most of the world's sulfur is produced as a by-product of the treatment of gas streams that come from the mining of fossil fuels. These gas streams contain dihydrogen sulfide (H_2S), which is recovered and transformed into sulfur using both energy and chemically intensive processes. As the world transitions to using more sustainable forms of energy, sulfur production will decrease and may no longer be available for use in industries such as agriculture. The biodesulfurization technology utilizes sulfide oxidizing bacteria (SOB) that convert H_2S gas to elemental sulfur under ambient conditions making it more sustainable than physiochemical processes. SOB remove sulfide (HS^-) in anaerobic conditions and reduce oxygen in sulfide-free condition [1]. This ability is called the shuttling capacity of the SOB, and the underlying mechanisms are not understood. Therefore, a multi-scale approach is needed to understand this ability.

This offer will focus on running and maintaining a continuous lab-scale reactor. It also includes continuous sampling and monitoring of the reactor. The goal is to monitor the shuttling-capacity during operation and provide real-time information on the process performance and potentially implement new process schemes.

Tasks:

- Maintain a continuous bioreactor system
- Perform sampling and analysis of water samples using different methods

Requirements:

- Currently enrolled as a BSc or MSc student; **
- Good communication in English – both written and oral;
- Enthusiastic, motivated, and team-oriented
- Background in environmental/chemical engineering, water technology, biotechnology or similar;
- Experience with laboratory work is preferred

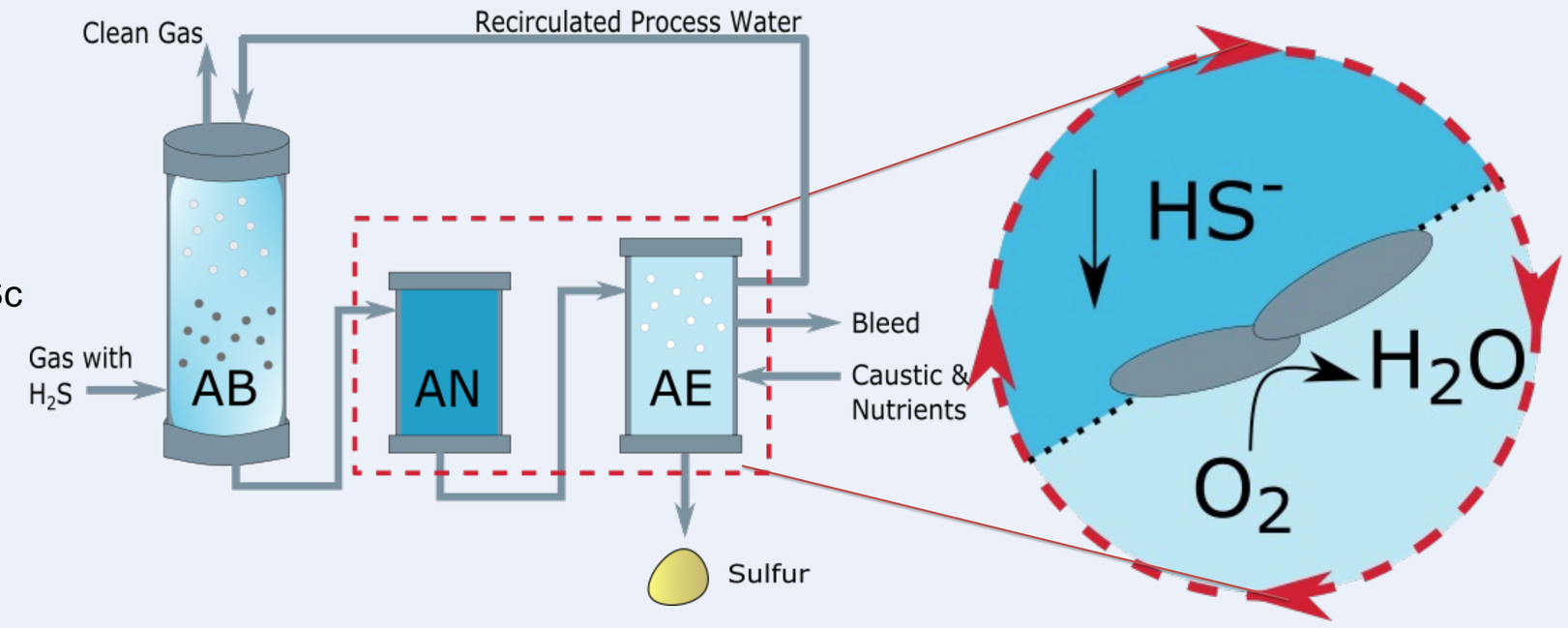

Fig 1. Current process design for the biodesulfurization process with an absorber column (AB), anaerobic reactor (AN), followed by the aerobic reactor (AE). The shuttling capacity occurs between the AN and AE reactors where the bacteria remove the HS^-, reduce oxygen, and produce elemental sulfur.

How to Apply:

If interested, please send your CV (max 2 pg.) and motivation letter (max 1 pg.) to Kestral Johnston at kestral.johnston@wetsus.nl

Please indicate your start date availability as well as your preferred project duration.

If you have any further questions regarding this position, please do not hesitate to send an email to kestral.johnston@wetsus.nl

** Note: Non-EU citizens must be enrolled at a Dutch university to be eligible for this project.

[1] ter Heijne, A., *et. al.,* Environmental science & technology letters, 5(8), (2018). 495-499.