

PhD or Post-doc**FARADAY Research Project: Integrated reactor for the production of
 $H_2/O_2/CO_2$ for CCU applications****Context**

Within the framework of the objectives of reducing CO_2 emissions, the lime sector is faced with the difficulty of reducing both the CO_2 emissions generated by combustion and, above all, the emissions related to the transformation of limestone into lime. The reduction of combustion emissions is possible through the use of renewable energy. In addition to sequestration, the transformation of CO_2 into chemical compounds by reaction with hydrogen from water electrolysis is a promising way to avoid industrial emissions of CO_2 linked to the process.

The objective of the project FARADAY, proposed by different partners, is to address these two challenges in the same process including:

- The electrification of the lime manufacturing process giving rise to a concentrated flow of CO_2 ;
- The production of hydrogen by electrolysis of water which, combined with CO_2 , will provide the reaction mixture (H_2/CO_2) necessary to convert CO_2 into chemical products.

UMONS will work with the partners to develop an innovative electrolyzer, including its upscaling.

UMONS is particularly committed to develop the modeling of the triphasic electrolyzer at the different stages of project (laboratory scale, pilot scale, industrial scale) and to perform Life Cycle Analyses of the whole process.

Candidate's profile

Candidates must hold a Master or PhD in Chemical engineering/chemistry or another applied science with a strong interest in energy and process engineering (process modeling and LCA). The mastery of modeling tools like AspenPlus, gPROMS or COMSOL Multiphysics, is an asset.

Languages: French or English (French is not mandatory)

Writing skills, good interpersonal and communication skills, rigor, conciseness and motivation will be highly appreciated.

The candidate will be hosted in a nice working environment under a challenging job at a dynamic and ambitious University. Salaries are in accordance with the internal University agreement and consists of 1950€/month (Master) to 2250€/month (net amount).

Duration

- Master: 36 months, a thesis is possible if the candidate is interested
- Post-Doc: 24 months

Applications (CV + motivation letter showing the adequacy with the requested profile) should be sent to:

- Diane THOMAS (Prof.): 32/(0)65 37 44 04 - diane.thomas@umons.ac.be - Chemical Engineering Department – rue de l'Epargne, 56 – 7000 Mons – BELGIUM
- Guy DE WEIRELD (Prof): 32/(0)65 37 42 08 - guy.deweireld@umons.ac.be – Thermodynamics Department – boulevard Dolez, 31 - 7000 Mons - BELGIUM

Both at the Faculty of Engineering (FPMs) – University of Mons (UMONS)

The work is expected to start between 1st June and 1st September 2021.
