

VACANCY PhD Position – Towards climate neutrality in the chemical industry? Assessing and improving electrification pathways for non-oxidative methane coupling

<https://www.ugent.be/nl/vacatures/oap/oap-vacature-toevoegen>

Job title: PhD student

Department: Green chemistry and technology

Occupancy rate: 100%

Type contract: PhD scholarship

Closing date: 20/02/2024

Diploma: master's degree in chemical engineering, bioscience engineering or equivalent.

Job description

The Sustainable Systems Engineering (STEN) group of Ghent University, led by Prof. Jo Dewulf, and prof. Kevin Van Geem from the Laboratory for Chemical Technology (LCT), welcome a candidate for a full time PhD position on assessing and improving electrification pathways via process modelling in the chemical industry. The PhD student will be appointed within the framework of the MOONSHOT project "CAMELEON" (Electrified catalytic non-oxidative methane coupling for separated hydrogen and ethylene production) funded by Flanders innovation & entrepreneurship (VLAIO).

The chemical industry is the world's largest industrial energy consumer and the third-largest source of industrial emissions. Therefore, new sustainable chemical production methods need to be developed and deployed and current emission-intensive chemical production technologies need to be reconsidered. Electrification is considered one of the key pathways to reduce the chemical industry's emissions. In CAMELEON, a disruptive technology will be developed for the catalytic non-oxidative coupling of methane (NOCM) via an electrified pathway consisting of two technologies: i) A shock wave reactor for the NOCM, combined with ii) a Pd-based supported membrane for H₂ separation.

In your PhD, you will assist in the development of the CAMELEON technology, contributing specifically to process modelling, assessment and optimization of its economic and environmental performance. Tasks within the PhD are:

- Development of unit operation and flowsheet models
- Quantifying mass and energy balances
- Model-based process optimisation
- Techno-economic assessment (TEA) and life cycle assessment (LCA)

In this PhD position, you will work in close collaboration with your promotors, other STEN colleagues and partners of the CAMELEON consortium, PhD researchers and experts at UGent and other Flemish universities.

The scientific findings should lead to publications in international peer reviewed journals and should be presented at international conferences. The final goal is a PhD thesis in which the scientific findings will be combined.

The start date is planned at April 1st 2024. The duration is 4 years.

Job Profile

Candidates are expected to have a chemical engineering background and/or affinity with chemical process modelling. Affinity with assessment methodologies such as techno-economic assessment and life cycle assessment is also relevant. We are looking for candidates with a critical and analytical attitude and a sense of initiative.

Other profile requirements:

- You hold a master's degree in chemical engineering, bioscience engineering or equivalent.
- The degree requirements must be met at the start of the appointment;
- You have an interest in scientific research;
- You can operate both independently and in a multidisciplinary team;
- You have organisational/managerial skills and are highly motivated;
- You have good writing and presentation skills;
- You master the English language, written and orally, in an academic context;
- Having experience with quantitative and/or qualitative research is essential;
- Additional plus points:
 - You have experience with process modelling software (e.g., Aspen Plus).
 - You have coding experience for modelling and simulating chemical processes
 - You have experience with LCA software such as SimaPro, openLCA, etc.
 - You have experience with the development and comparison of different value chain scenarios;

How to apply

Send an email to Dr. Pieter Nachtergaele (Pieter.Nachtergaele@ugent.be) before February 20th, 2024, with subject 'PhD application for CAMELEON' and include:

CV, study results in a file with name 'CV surname'

Motivation letter in a file with name 'Motivation letter surname'

Contact details (name, phone email) of at least one reference, one reference person

Selection will be based on competences, independent from gender, religion, ethnicity, age, sexual orientation or physical disability.

For more information, please contact Dr. Ir. Pieter Nachtergaele (Pieter.Nachtergaele@ugent.be)