LABORATORY FOR CHEMICAL TECHNOLOGY
Technologiepark 125, 9052 Gent, Belgium

Supervisor(s)	Period	Funding ISPT (Institute for Sustainable Process Technology, NL), Sasol, Shell
Prof. dr. ir. René Bos Prof. dr. ir. Joris Thybaut	4 years	

PhD position: Reactor Technologies for Conversion of Plastic Recyclates.

Context

Join REFCORE as a PhD researcher and help developing the future circular carbon economy. REFCORE is a four-year program, in which you will work on fundamental reaction engineering challenges, advanced heat-transfer concepts, and electrified conversion routes for the development of novel conversion reactors for mixed plastic recyclates.

Your research will mostly involve reactor and systems modelling and (experimental data) analysis, in close collaboration with experts developing and testing inductive-heating particles and novel reactor designs. You will be part of a strong academic–industrial consortium, providing access to state-of-the-art facilities and interdisciplinary supervision. The academic partners include TU Delft, TU-Eindhoven and University of Twente (NL) and University of Ghent (B), with one PhD student and/or a post-doc at each of these universities.
This is your opportunity to shape next-generation recycling technologies in support of a sustainable, electrified process industry.

Program and job description (Ghent University)

The proposal anticipates on assessing two technology pathways: (i) dry conversion of plastic recyclates (granulates), which are fast heated and decomposed in an electrified “FCC-type” process (gas phase continuous); and (ii) conversion in a liquid-pool configuration (e.g., slower but possibly more selective decomposing in melt phase, with products leaving via gas phase). For energy input, inductive heating is anticipated (but requiring particle recovery/regeneration). Synthesis of these induction-active (catalytic) particles is an objective, as well as the investigation of the capabilities, efficiency and robustness of this method.

The main 5 Work Packages (WP’s) in the overall REFCORE project comprise:
WP1 System analysis and Concept development
WP2 Catalyst carrier development for inductive heating
WP3 Gas phase processing (FCC-type) using induction heating
WP4 Liquid pool conversion systems
WP5 Techno-economic evaluation

The PhD position at Ghent University will focus primarily on WP1 and WP5. However, the PhD student is expected to work closely together with other partners and contribute to all 5 WP’s. Moreover, a temporary secondment at one of the other partners’ locations is recommended.

WP1 encompasses a thorough and critical review of the state of the art, insights in mechanisms, potential products, catalysts etc. and an interpretation with respect to the integration potential to downstream operations. Feed and targeted products are selected, in view of potential application / valorization routes (in consultation with industry). Where needed and possible in collaboration with the other partners, additional (scouting) experiments will be carried out to confirm ‘proof of principle’ conversions. The scope of the targeted conversions is defined, with selected “idealized” conversion conditions (‘wishlist’). Based on this, the conversion routes and concepts for reactor and process are formulated. After year 1, focus is put on determination of reaction schemes and kinetics and, where relevant, on the impact of downstream separation.

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In WP5, which runs in parallel to all other WP's, the process is evaluated with respect to commercial scale technical feasibility, scale-up risk, techno-economics economics based on carbon and energy balances and the efficiency/integration within the value chain plastic-to-plastic (full recycle).

Advisors

- Prof. dr. ir. Bos, see René Bos
- Prof. dr. ir. Thybaut, see Joris Thybaut

Candidate Profile

Requirements

- At start of the project: holder of a master's degree in chemical engineering
- Experience with and a strong interest in reaction engineering and systems analysis.
- Modelling and simulation expertise, involving numerical methods, regression, programming
- Experience with reactor and kinetic modeling is a strong plus.
- You are a team player but can also work independently with a strong feeling of responsibility for your project.
- A good proficiency in English (oral and written)

How to apply and application process

Apply before 1 May 2026 by sending an email to René Bos (Rene.Bos@UGent.be) and Joris Thybaut (Joris.Thybaut@UGent.be). Your application should include:

- your resume (curriculum vitae), including overview of courses followed and grades.
- motivation letter

Qualified candidates will be invited for an interview as applications are evaluated. In the interview the candidate is expected
This PhD position is available immediately and is open until the vacancy is filled. More information can be obtained via René Bos and or Joris Thybaut.

A PhD at UGent and the LCT

We offer a challenging, stimulating, young and pleasant research environment where you can contribute to solving real-life problems for technological innovations with a clear societal as well as economic value. The UGent doctoral school program offers possibilities for following a range of courses or trainings of your interest. We foresee a competitive remuneration and the possibility to obtain a PhD degree in Engineering. You will receive a PhD scholarship for 4 years, with an evaluation after the first year (1+3 contract).

The Laboratory for Chemical Technology (LCT) at Ghent University (UGent) is one of the few laboratories around the globe spanning the entire range of chemical engineering aspects from the molecular (even atomistic) up to the process scale. Over 100 researchers with diverse backgrounds, under the supervision of 10 professors and supported by 10 administrative and technical persons, collaborate on ab initio assessment of advanced kinetics and thermodynamics, experimental acquisition of fundamental information, computational analysis of reactor hydrodynamics, and much more.

More information, including benefits:
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