

PhD position:

Chemical Recycling of polyamides into innovative materials

Host institutes:

The **Unit of Separation and Conversion Technology** (SCT, Flemish Institute for Technological Research, VITO) develops technologies for the sustainability of production processes in the (bio)chemical sector, replacement or reuse of fossil resources for the chemical industry and the treatment of waste streams into high value chemicals. A strategic research theme is focusing on the reuse of carbon as an alternative feedstock for the production of materials. In this perspective, chemical recycling of waste plastics is in line with VITO's goal which is to accelerate the transition to a sustainable world where sustainability is the norm. More information available on <https://spot.vito.be/en>.

The **Catalysis and Sustainable Polymers Group** at POLYMAT (UPV-EHU) aims to prepare new functional polymeric materials using sustainable polymerization. Specially, our investigations involve the synthesis of new polymers using "green" polymerization processes such as monomers from polymer recycling, reagents from renewable sources or the use of less hazardous organocatalysts. The group is part of POLYMAT is an internationally reputed university research institute in Polymer Science. It was recently recognized as a BERC (Basque Excellency Research Centre) to launch new research lines in polymers for health, energy and sustainability. It has more than 50 PhD students and post-doctoral fellows. In the last 5 years more than 100 students from Polymat obtained their PhD. More information available on <https://haritzsardonlab.com>

Up to now, both groups have developed strong expertise in chemical depolymerization technology. Indeed, both have renowned reputation in the field of biomass valorization through conversion of lignocellulose into value-added lignin fragments and bio-aromatic derivatives. Furthermore, VITO holds a solid knowledge in polymer formulation using depolymerized complex mixtures as building blocks.

We are looking for a **master student for a 4 years PhD** research to work. The PhD will have the opportunity to use the best of 2 groups, i.e., VITO and UPV-EHU and will work at both places (year 1&2 in Spain; year 3&4 in Belgium). The focus of the PhD is on the development of a chemical recycling method to chemically recycle polyamides into multifunctional depolymerization products which will be subsequently re-polymerized to generate a wide array of functional materials.

Closing date for applications: 30/07/2022

Starting date: 1/9/2022 (1 year) + 3 years extra (after positive evaluation)

Project Description:

This position fits within a collaborative project between VITO and Polymat. This research project will involve aspects of catalysis, characterization of complex depolymerization mixtures, chemical modification and evaluation in polymer formulations.

The following tasks/actions are foreseen in our project to be conducted by the candidate, focusing on the chemical recycling of polyamides with a focus on catalytic depolymerization and re-polymerization into functional materials:

- Active literature survey, keeping up to date with relevant articles and patents in the fields
- Detailing out the work protocol after discussion with the experts involved
- Execution of the work in laboratory
- Data interpretation and plan for next possible steps: in discussion with experts
- Execution of the experiments/tasks in a timely and efficient manner according to the overall project planning
- Preparing presentations for the meetings/reports.
- Scientific output and/or patent submission as a result of the work would be highly recommended
- Ensure compliance with VITO/UPV-EHU Health & Safety Policy, and take a proactive approach to ensure all experimental work is safe

Required education/discipline/profile of candidates:

- Master in Chemistry/Chemical Engineering
- Background in polymer design and synthesis or catalysis is recommended
- Knowledge on working on process development is an asset, as well as conceptual design know how.
- You have a result-driven character capable of translating theory to practice and vice versa and are able to find solutions.

- You are proactive, motivated and an excellent team player who enjoys working in a multidisciplinary environment
- You are interested to acquire hands-on experience by running innovative experimental set-ups.
- You are fluent in English and eager to write scientific papers and/or patents

Application process

Applications should be addressed to Prof. Haritz Sardon and sent via email in one single PDF to kathy.elst@vito.be and haritz.sardon@ehu.es until the July 30th, 2022 (inclusive). Applications must indicate the title of the position on the email subject and include:

- (i) a cover letter highlighting their interest in the position.
- (ii) curriculum vitae.
- (iii) a short description of previous research (1-2 Pages).
- (iv) the names and contact addresses (e-mail) of two academic referees.

Applications will be considered upon arrival.

Contact persons for more information:

Kathy Elst (kathy.elst@vito.be) and Haritz Sardon (haritz.sardon@ehu.es)