

The PLASynthH2 project granted in the framework of the **Belgian Excellence of Science (EOS) program** of FWO-FNRS is looking for **10 PhD students and 4 post-docs** in the field of plasma chemistry, plasma technology or plasma physics.

PLASynthH2: Plasma-based green hydrogen synthesis from hydrocarbons

Project description

Plasma-based H₂ synthesis from hydrocarbons is an interesting complementary approach to water electrolysis, because it also uses renewable electricity and has no CO₂ emission, and in addition, it can valorize CH₄ and plastic waste, generate high value C-materials as side-product, and is thermodynamically more favorable. However, before exploiting this application, it is crucial to gain a better fundamental understanding of the plasma processes.

This is exactly addressed in our project. We will perform green H₂ synthesis experiments from **various hydrocarbons and in several plasma types, in gas-phase and in contact with liquids**, and develop a **multi-diagnostics platform** for time- and spatially-resolved characterization, as well as **novel multi-dimensional, multi-scale models**, to study the underlying mechanisms in all plasma systems. We will start with simple molecules, i.e., CH₄ (gas-phase) and (m)ethanol (liquid-phase), and subsequently develop our methodologies to study H₂ synthesis from alkenes (C₃-C₅ and higher) and styrene, as model systems for (both gas-phase and liquid-phase) pyrolysis products of plastic waste. Besides determining the H₂ yield and energy consumption for all systems, and the detailed plasma diagnostics and modelling, we will also characterize the synthesized C, and target the latter as extra value-added product. The project outcomes will lay the basis for green H₂ synthesis by plasma technology and will open up a new area in the field of plastic waste recycling.

Consortium

PLASynthH2 is a collaboration between the following PI's and universities in Belgium:

- BOGAERTS Annemie, Coordinator – University of Antwerp (www.uantwerpen.be/plasmant)
- DE GEYTER Nathalie – Ghent University (www.ugent.be/ea/appliedphysics/en)
- MORENT Rino – Ghent University (www.ugent.be/ea/appliedphysics/en)
- RENIERS François – Université Libre de Bruxelles (<http://chemsin.ulb.be/>)
- SNYDERS Rony – University of Mons (<https://chips.umons.ac.be/index.php/fr/>)

Profile of envisaged PhD students

- You should have a master degree in one of the following fields: chemistry, physics, physical chemistry, material science, engineering physics, chemical engineering, material engineering, or equivalent.
- Candidates graduating this summer are also encouraged to apply.
- You should have excellent qualifications at bachelor and master levels.
- You should have an independent and well-organized working style, demanding a high standard for your own work.
- You should have well-developed social skills directed towards working in an interdisciplinary team as well as excellent interpersonal and communicative skills.
- You should have very good to excellent English language skills (verbally and written).

We offer to PhD students

- A full-time (100%) PhD student position as a bursary. The scholarship is initially offered for a period of one year and will be renewed up-to four years upon positive evaluation.
- A competitive salary for doctoral students.
- A challenging, versatile and carefully designed project.
- A dynamic, multi-disciplinary and ambitious research consortium with a wide international network.
- Full access to expertise, state-of-the-art research infrastructure and user training.
- Access to a Doctoral Training Program.
- An opportunity to earn the highest academic degree.
- Envisaged starting date: as soon as possible.
- All PhD students will work in two of the above-mentioned research groups, co-supervised by 2 PI's, and will obtain a joint or double PhD diploma.

Profile of envisaged post-doctoral fellows

- You should have a PhD diploma or should be expecting to obtain a PhD in the near future in the field of plasma physics, plasma chemistry or plasma technology.
- Specific experience in either atmospheric plasma technology, plasma engineering, plasma diagnostics or plasma computational fluid dynamics modeling is mandatory.
- You should show an excellent track record of publications in one of these requested research fields.
- You are a team player, you have a strong personality and you work in a result-oriented manner.
- You are creative and willing to work in a multidisciplinary context.
- You are proficient in oral and written English and have strong communication skills.

We offer to postdoctoral fellows:

- A full-time position, initially offered for one year, but it could be renewed up to maximum four years upon positive evaluation.
- You will be directly embedded in a research consortium composed of plasma-oriented international research teams of different Belgian universities.
- You will have access to state-of-the-art tools and facilities, a rich training environment and the possibility to collaborate with many other groups within excellence-based universities.
- Envisaged starting date: as soon as possible.

How to apply:

Applications must contain the following documents in English:

- Personal (motivation) letter
- Curriculum vitae (an official proof of English language skills is an added value)
- List of publications (if available)
- Transcripts of B.Sc. and M.Sc. courses and grades
- Copy of your diplomas (if already available)
- Indication of your preference for experiments or modelling or a combination of both
- Indication of your preference of university/research group where you want to apply (see websites above); PhD students should indicate two research groups or their preferred research topics

The requested documents should be sent to Prof. dr. Annemie Bogaerts (PLASynth2@uantwerpen.be) before February 28th, 2022, entering as subject of your mail: PLASynth2_your name