

Do you want to synthesize hydrogen by plasma? You have a background in plasma chemistry, plasma physics, or plasma technology ?

ChemSIN is looking for one post-doctoral researcher, and one PhD student (shared with UGent) to work on the PLASynthH2 project granted in the framework of the **Belgian Excellence of Science (EOS) program** of FWO-FNRS.

## **PLASynthH2: Plasma-based green hydrogen synthesis from hydrocarbons**

### **Project description**

**Plasma-based H<sub>2</sub> synthesis from hydrocarbons** is an interesting complementary approach to water electrolysis, because it also uses renewable electricity and has no CO<sub>2</sub> emission, and in addition, it can valorize CH<sub>4</sub> 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 H<sub>2</sub> 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., CH<sub>4</sub> (gas-phase) and (m)ethanol (liquid-phase), and subsequently develop our methodologies to study H<sub>2</sub> synthesis from alkenes (C<sub>3</sub>-C<sub>5</sub> and higher) and styrene, as model systems for (both gas-phase and liquid-phase) pyrolysis products of plastic waste. Besides determining the H<sub>2</sub> 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 H<sub>2</sub> 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](http://www.uantwerpen.be/plasmant))
- DE GEYTER Nathalie – Ghent University ([www.ugent.be/ea/appliedphysics/en](http://www.ugent.be/ea/appliedphysics/en))
- MORENT Rino – Ghent University ([www.ugent.be/ea/appliedphysics/en](http://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 recently graduated 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 the PhD student**

- 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.
- The PhD students will work partly in ULB and partly in UGent, co-supervised by 2 PI's, and will obtain a joint or double PhD diploma.

### **Profile of the post-doctoral fellow**

- 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, plasma chemistry 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 the postdoctoral fellow:**

- 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)

The requested documents should be sent to Prof. François Reniers ([Francois.Reniers@ulb.be](mailto:Francois.Reniers@ulb.be)) entering as subject of your mail: PLASynthH2\_your name. Starting date: as soon as possible.