



The
University
Of
Sheffield.

3.5 years PhD studentship, starting October 2020

Graphene-based sensors for soil analysis: spectroscopic and theoretical study

Project description

In this project, you will use a combination of advanced laser spectroscopy and quantum chemistry to investigate graphene-based materials for use as sensors. Our goal is to develop highly selective and low-cost graphene-based sensors to detect a variety of small molecules and ions in soil. Thus this project will help address a key environmental problem of monitoring plant nutrients, such as phosphate and nitrate, in soil.

Graphene is already being exploited as a sensor material. Advantageously, graphene is highly versatile and can be altered in composition (through doping or defects) as well as structurally (from planar to 3D via laser ablation). Any alteration in composition and structure will alter the sensing properties of these graphene materials. In other words, graphene can be fine-tuned to sense specific small molecules or ions.

You will be part of an active, interdisciplinary research team at the University of Sheffield. This project will be a jointly supervised by Dr Adrien Chauvet (spectroscopy) and Dr Natalia Martsinovich (computational modelling).

In Dr Chauvet's group, you will explore the electronic properties of various graphene surfaces using the latest time-resolved ultrafast spectroscopy equipment available in the Lord Porter Laser Laboratory.

In Dr Martsinovich's group, you will explore the theoretical affinity of these various graphene surfaces to small molecules and ions, such as phosphate.

With this dual approach, you will be able to correlate experimental and theoretical data to inform development (via existing collaboration) of new graphene sensors.

This studentship is aligned to the funded interdisciplinary project "Real-time and Continuous Monitoring of Phosphates in the Soil with Graphene-Based Printed Sensor Arrays", where the groups of Dr Chauvet and Dr Martsinovich work together with materials scientists and soil scientists in the UK and US to develop a sensor for monitoring phosphate in soil.



Eligibility

You are an enthusiastic student that has or expects to receive a 1st class or 2.1 MChem degree or equivalent in Chemistry or related subject. You are willing to work in a diverse environment, are self-motivated and have leaderships abilities.

This studentship is open to UK and EU applicants only. UK applicants and EU applicants who have been ordinarily resident in the UK for at least 3 years prior to the start of the studentship are eligible for a fully-funded studentship (fees and a stipend). EU citizens who did not have lived in the UK for the last 3 years preceding the start of the studentship would normally be eligible for a Fees Only Award. The Fee Award does not include a stipend, therefore additional funding to cover living costs for at least 3 years need to be sought from another source.

How to apply

Deadline: 18 May 2020.

Apply online at:

<https://www.sheffield.ac.uk/postgraduate/phd/apply/applying>

For more information about the project, please contact Dr Adrien Chauvet (a.chauvet@sheffield.ac.uk) or Dr Natalia Martsinovich (n.martsinovich@sheffield.ac.uk).

The University of Sheffield is a **world top 100 university** and **world top 50 most international**, situated at the edge of Sheffield's historical downtown, and only 6km away from the Peak District national park with direct train connections to London (2.5h), Manchester (1h) and Leeds (<1h).

Please contact a.chauvet@sheffield.ac.uk for any queries, or apply directly at <http://bit.ly/Job-Chauvet>

We are looking forward to hearing from you.

Dr. Adrien Chauvet & Dr. Natalia Martsinovich, Chemistry Dept., Dainton Building, The University of Sheffield, Sheffield S3 7HF, United Kingdom.

<https://teamchauvet.com/>

https://www.sheffield.ac.uk/chemistry/staff/profiles/natalia_martsinovich

<https://www.sheffield.ac.uk/faculty/science/research/facilities/laserlab>

