Project title: **Bio-derived super-hydrophobic surfactants**
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**Project Description:**
Perfluorinated surfactants have had widespread application due to their diverse properties of high surface activity at low concentration, tolerance of highly acidic or basic environments, thermal stability and that they display both hydrophobic and lipophobic character. Longer chain variants have already been phased out of many applications, being classified as PBT (persistent, bio-accumulative, toxic) and with the shorter chain analogues looking likely to increasingly coming under more strict regulation.

As such there is a need to synthesise non-perfluorinated compounds with similar properties for specific applications. Replicating the properties of perfluorinated surfactants without relying on halogen chemistry is not trivial, but as such represent an exciting challenge for a PhD research project. The focus of this research will be on the design and synthesis of super-hydrophobic amphiphilic compounds using chemical building blocks (platform molecules) derived from biomass.

This research will be carried out in conjunction with Croda International Ltd, with a strong industrial input on the research, exposure to the wider world of commercial chemicals in a sustainable company and the opportunity to carry out analysis and testing of outputs of this PhD at their research facilities.

The PhD will be fully funded under the “RenewChem” initiative ([https://www.york.ac.uk/chemistry/research/green/renewchem/](https://www.york.ac.uk/chemistry/research/green/renewchem/)). RenewChem students are expected to take a somewhat wider interest in green and sustainable chemistry than normal PhDs. This includes a specially designed training module that introduces topics including Change Management, Environmental Impact and the Commercialisation of Science. In addition to collaborating with a company, RenewChem students have the opportunity to spend a period of their research in a laboratory in one of our collaborating green and sustainable chemistry centres located across the globe ([www.g2c2.greenchemistrynetwork.org](http://www.g2c2.greenchemistrynetwork.org)).
Training:

All research students follow our innovative Doctoral Training in Chemistry (iDTC): cohort-based training to support the development of scientific, transferable and employability skills. All research students take the core training package which provides both a grounding in the skills required for their research, and transferable skills to enhance employability opportunities following graduation. Core training is progressive and takes place at appropriate points throughout a student’s higher degree programme, with the majority of training taking place in Year 1. In conjunction with the Core training, students, in consultation with their supervisor(s), select training related to the area of their research.

Project specific training will include advanced organic synthesis methods for the preparation of the surfactant candidates from bio-based chemical and the use of computational models to help guide the research towards to the most suitable target structures. Clean synthetic methods will be used throughout the project and may include training in the use of microwave and flow reactors. Training will also be offered by Croda for application testing of the surfactants developed during the study.

Equality and Diversity:

The Department of Chemistry holds an Athena SWAN Gold Award and is committed to supporting equality and diversity for all staff and students. The Department strives to provide a working environment which allows all staff and students to contribute fully, to flourish, and to excel. Chemistry at York was the first academic department in the UK to receive the Athena SWAN Gold award, first attained in 2007 and then renewed in October 2010 and in April 2015.

Funding:

Value: The studentship is fully funded by industry and covers: (i) a tax-free annual stipend at the standard Research Council rate (£14,553 for 2017-18), (ii) tuition fees at the UK/EU rate, (iii) research costs.

Eligibility: The studentship is available to UK and EU students who are eligible to pay tuition fees at the ‘home’ rate

Candidate selection process:

- Candidates should submit an online application for a PhD in Chemistry as soon as possible and by 6 April 2018 at the very latest. If a suitable candidate is found before 6 April, the project will be offered and no more applications will be accepted
- Supervisors may contact their preferred candidates either by email, telephone, web-chat or in person
- Following interviews, supervisors will select their preferred candidate from those that meet the University’s entry requirements
- Candidates will be notified of the outcome by email

The PhD is available to start between 1 May 2018 and 1 October 2018 depending on the availability of the successful candidate.

For more information contact chemgrad@york.ac.uk or see our web page: http://www.york.ac.uk/chemistry/postgraduate/