Imperial College London

Department of Mechanical Engineering

PhD Studentship in Experimental Mechanochemistry

Applications are invited for a research studentship in the field of Mechanochemistry, with a focus in Tribology, leading to the award of a PhD degree. The post is supported by a bursary and fees (at the UK student rate) provided by the EPSRC / Shell. EPSRC candidates should fulfil the eligibility criteria for the award. International candidates will be considered.

Lubricants are complex fluids whose are crucial the efficiency and durability of machines. They consists of a base fluid and multiple functional additives. Some of these additives, including friction modifiers and antiwear additives, are surface actives and form protective films on rubbing surfaces. It is now realised that the reactions by which these protective films (tribofilms) are formed are driven by the enormous mechanical forces experienced by individual additive molecules within rubbing contacts, *i.e.* mechanochemistry. The ability of these additives to form tribofilms is thus determined by the way their molecular structure experiences and responds to applied forces.

This project is experimental and will explore the influence of molecular structure of model lubricant additives on tribofilm formation and composition. Of particular interest will be phosphate esters and some friction modifiers likely to be used in electric vehicle transmission oils. It will employ advanced tribology test equipment to form and monitor in situ the kinetics of formation and composition of tribofilms using advanced laser spectroscopies. Based on this it will determine the molecular mechanisms of tribofilm formation involved.

You will be an enthusiastic and self-motivated person who meets the academic requirements for enrolment for the PhD degree at Imperial College London. You will have a 1st class honours degree in chemistry, chemical engineering, mechanical engineering or a related subject, and an enquiring and rigorous approach to research together with a strong intellect and disciplined work habits. An interest in chemistry and engineering is essential. Good team-working, observational and communication skills are essential. You will be required to communicate with the industrial partners, will have the opportunity to attend multiple international conferences during your PhD and publish your work in scientific journals.

To find out more about research at Imperial College London in this area, go to:
https://www.imperial.ac.uk/mechanical-engineering/research/

For information on how to apply, go to:
http://www.imperial.ac.uk/mechanical-engineering/study/phd/how-to-apply/

For further details of the post contact Dr Janet Wong j.wong@imperial.ac.uk Interested applicants should send an up-to-date curriculum vitae to Dr Wong. Suitable candidates will be required to complete an electronic application form at Imperial College London in order for their qualifications to be addressed by College Registry.

Closing date: until post filled