

PhD studentship (Full-time)



Institution	Xi'an Jiaotong-Liverpool University, China
School	School of Science
Supervisors	Principal supervisor: Dr. Lifeng Ding (XJTLU) Co-supervisor: Dr. Qiuchen Dong (XJTLU) Co-supervisor: Dr. Matthew Dyer (UoL)
Application Deadline	Open until the position is filled
Funding Availability	Funded PhD project (world-wide students)
Project Title	Computer-Aided Design of Conductive MOF-based Sensors for Trace Organic Carbonates Detection
Contact	Please email Lifeng.Ding@xjtlu.edu.cn (XJTLU principal supervisor's email address) with a subject line of the PhD project title

Requirements:

The candidate should have a first class or upper second class honours degree, or a master's degree (or equivalent qualification), in Chemistry, Physics, Chemical Engineering, Electronic Engineering or Material Science. Evidence of good spoken and written English is essential. The candidate should have an IELTS score of 6.5 or above, if the first language is not English. This position is open to all qualified candidates irrespective of nationality.

Degree:

The student will be awarded a PhD degree from the University of Liverpool (UK) upon successful completion of the program.

Funding:

The PhD studentship is available for three years' subject to satisfactory progress by the student. The award covers tuition fees for three years (currently equivalent to RMB 80,000 per annum) and provides a monthly stipend of 5,000 RMB as a contribution to living expenses. It also provides up to RMB 16,500 to allow participation at international conferences during the period of the award. It is a condition of the award that holders of XJTLU PhD scholarships carry out 300-500 hours of teaching assistance work per year. The scholarship holder is expected to carry out the major part of his or her research at XJTLU in Suzhou, China. However, he or she is eligible for a research study visit to the University of Liverpool of up to six months, if this is required by the project.

Project Description:

Lithium-ion battery (LIB) is one indispensable energy storage mean in current modern society. LIB provides high energy density and power capacity, but meanwhile, such high power capacity poses serious safety concerns during possible LIB failure events. Most of the LIB failure events are linked with a highly flammable organic carbonates containing electrolyte leakage from LIBs. Early detection of LIB electrolyte leakage will offer invaluable time to Intervene the leakage event. Up to now, limited research of LIB electrolyte leakage detection has been studied. This project aims to design and fabricate conductive metal-organic frameworks (MOFs)-based chemoresistive sensors that will detect the trace organic carbonates during an electrolyte leakage from LIBs. Molecular simulations will be used to screen and understand the MOFs for detecting organic carbonates (OC) with good selectivity and sensitivity. Experimental work will be followed to fabricate the MOF-based sensors.

MOFs were long thought to possess poor electrical conductivity, which limited their application in chemoresistive sensing applications. The usual construction of MOFs through a self-assembly of metal ions/clusters and redox-inactive organic ligands gives high-energy pathways for charge transport. Only in the past ten years, both the number of conductive MOFs and their applications, such as field-effect transistors, thermoelectrics and battery electrode/electrolyte etc. are growing, as new approaches that use redox-active linkers to realize conductive MOFs are emerging. The MOF-based sensors are still under development. And the sensing mechanisms of how an electrical response changes with various gas molecules' loading in the MOFs are yet fully explored. In this work, we aim to not only design and fabricate MOF-based chemoresistive sensors that can detect trace OCs with good selectivity and sensitivity, but also provide a molecular level understanding of the OCs sensing mechanism in the MOFs.

For more information about doctoral scholarship and PhD programme at Xi'an Jiaotong-Liverpool University (XJTLU): Please visit

<http://www.xjtlu.edu.cn/en/study-with-us/admissions/entry-requirements>

<http://www.xjtlu.edu.cn/en/admissions/phd/feescholarships.html>

How to Apply:

Interested applicants are advised to email Lifeng.Ding@xjtlu.edu.cn (XJTLU principal supervisor's email address) the following documents for initial review and assessment (please put the project title in the subject line).

- CV
- Two reference letters with company/university letterhead
- Personal statement outlining your interest in the position
- Proof of English language proficiency (an IELTS score of 6.5 or above)
- Verified school transcripts in both Chinese and English (for international students, only the English version is required)
- Verified certificates of education qualifications in both Chinese and English (for international students, only the English version is required)
- PDF copy of Master Degree dissertation (or an equivalent writing sample) and examiners reports available

Informal enquiries may be addressed to Dr. Lifeng.Ding (Lifeng.Ding@xjtlu.edu.cn), whose personal profile is linked below,

<https://www.xjtlu.edu.cn/en/departments/academic-departments/chemistry/staff/lifeng-ding>