PhD studentship (Full-time)

Institution	Xi'an Jiaotong-Liverpool University, China
School	School of Advanced Technology
Supervisors	*Please list all the names in the supervisory team. It should be consistent with the information on your approved PGRS proposal.* Principal supervisor: Dr.Yingli.Shi (XJTLU) Co-supervisor: Dr.Chun Zhao (XJTLU) Co-supervisor: Dr.Youbin.Zheng (UoL) External supervisor: Dr. Xuedong Wang (Soochow University)
Application Deadline	Open until the position is filled
Funding Availability	Funded PhD project (world-wide students)
Project Title	Design and synthesis of organic cocrystals for broadband photodetectors
Contact	Please email: Yingli.Shi@xjtlu.edu.cn (XJTLU principal supervisor's email address) with a subject line of the PhD project title. The principal supervisor's profile is linked here: https://scholar.xjtlu.edu.cn/en/persons/YingliShi https://scholar.google.com.hk/citations?user=bXlZUDMAAAAJ&hl=zh-CN&oi=ao

Requirements:

The candidate should have a first class or upper second class honours degree, or a master's degree (or equivalent qualification), in Materials Science, Semiconductor Physics, Chemistry, and other related fields.

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 99,000 per annum). It also provides up to RMB 16,500 to allow participation at international conferences during the period of the award. 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 up to six months, if this is required by the project.

Project Description:

Photodetector from the ultraviolet (UV)-visible to the infrared is critical for a variety of industrial and scientific applications, including image sensing, communications, environmental monitoring, remote control and chemical/biological sensing. Compared with detectors working in a single band, wide-band detectors can obtain more spectral information and have stronger anti-interference capabilities. However, most current broadband photodetectors require complex fabrication techniques, which results in the complexity of the optoelectronic system and the large size of the device. Therefore, the development of functional materials with high quantum efficiency, high sensitivity, and high speed over the broad spectral range and simple preparation processes is urgently necessary for the application of wide-band photodetectors in integrated optoelectronic systems.

Compared with traditional inorganic photodetector materials (such as GaN, Si, HgCdTe and InGaAs, etc.), organic functional materials are indispensable for device development with the advantages of solution-process capability, low temperature processability, light weight, and flexibility, which are widely applied in the fields of organic photovoltaics (OPVs), organic light-emitting diodes (OLEDs), organic field-effect transistors (OFETs), photodetectors, and lasers, etc. In particular, organic single-crystal materials with features of nongrain boundaries, minimized impurities, and free defects are essential for enhanced device performance concerning their corresponding polycrystalline or amorphous thin films. In recent years, organic low-dimensional micro-nano crystal materials have shown extraordinary development prospects in high-performance photo detection applications. However, until now, the vast majority of photodetectors reported are single-component organic micro-nanocrystal materials, and the absorption is mainly concentrated in a single wavelength band, which brings challenges to the construction of high-performance photodetectors with wide spectral response. Therefore, developing organic crystal materials with broad spectral response from the ultraviolet to visible to infrared region remains a great challenge in the field of optoelectronic engineering.

Herein, this project intends to develop organic cocrystal micro/nanostructures with narrow bandgap, and high absorption behavior in wide wavelength range by rationally selecting organic electron donors and acceptors to regulate CT interaction, enhance energy matching, and optimize the molecular packing modes in the solution self-assembly process. Furthermore, the organic cocrystal micro/nanostructures with multifunctional properties will be employed to construct the high-performance broadband photodetectors (ultraviolet to infrared).

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

https://www.xjtlu.edu.cn/en/admissions/global/entry-requirements/

https://www.xjtlu.edu.cn/en/admissions/global/fees-and-scholarship

How to Apply:

Interested applicants are advised to email Yingli.Shi@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 formal reference letters
- Personal statement outlining your interest in the position
- Certificates of English language qualifications (IELTS or equivalent)
- Full academic 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