



University of
Nottingham
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CNITECH

UNNC-CNITECH, CAS Doctoral Training Partnership

Available PhD topics

PhD topic 1	Design and preparation of bionic smart materials and their application in soft robots
CNITECH Supervisor	Prof. Yuchuan Cheng
UNNC Supervisor(s)	Prof. Xiaogang Yang
Short introduction & description of PhD	<p>In recent years, soft robots have attracted widespread attention from academia and industry due to their elastic, deformable, and safe characteristics. Compared with rigid devices, soft devices have a higher degree of bending and greater freedom, so they can move in narrow spaces and complex environments. Given its good human-robot interaction and environmental adaptability, soft robotics have huge advantages in wearable and implantable devices, medical care, complex terrain exploration, etc.</p> <p>Smart soft materials owning elegant properties of simple operation, programmability, fast response, and tunable stiffness have wide applications in soft actuators, robots This project will focus on two major dimensions on (i) Preparation and performance research of smart composite materials and (ii) design and 3D printing of biomimetic soft robots.</p>
Contact points	<p>Informal inquiries may be addressed to Prof. Xiaogang Yang (Xiaogang.Yang@nottingham.edu.cn) and Prof. Yuchuan Cheng (yccheng@nimte.ac.cn), but formal applications should follow the instructions in 'How to apply' section.</p>
PhD topic 2	Sp² Carbon Conjugated Two-Dimensional Covalent Organic Frameworks for Water Treatment
CNITECH Supervisor	Prof. Tao Zhang
UNNC Supervisor(s)	Prof. Jun He
Short introduction & description of PhD	<p>Purification of water sources is one of the greatest challenges facing the world today, since huge areas of the planet are suffering from poor water quality because of the increasing contaminations from organic compounds as well as microorganisms. Two-dimensional covalent organic frameworks (2D COFs) especially that are connected by sp² carbon conjugated linkages have emerged as promising candidates for water treatment in recent years. Their excellent structural regularity, robust framework, and inherent permanent porosity provide an innovative platform for constructing novel organic materials with excellent adsorption, separation and catalytic properties, which are thus promising for different water purification processes. In this potential PhD project, we intend to extensively investigate the practical optimization of material synthesis process, efficacy assessment of pollutant removal/degradation, and its theoretical working mechanism, etc.</p>

Contact points	Informal inquiries may be addressed to Prof. Tao Zhang (tzhang@nimte.ac.cn) and Prof. Jun He (Jun.He@nottingham.edu.cn), but formal applications should follow the instructions in 'How to apply' section.
PhD topic 3	Study on thermal management for high-power electric motor systems
CNITECH Supervisor	Jiqiang Wang
UNNC Supervisor(s)	Yong Shi
Short introduction & description of PhD	<p>Last several decades witnessed the burgeoning development of electric motors with increasing power outputs. In particular, some high-power motor systems have been fabricated, which not only achieve rather high operating efficiency, but also remain a relatively small size and a light weight. Due to these favourable features, such high-power motor systems have attracted tremendous interests from a large variety of industrial applications, including aviation, ocean shipping, electric motors and to name a few. However, many high-power electric motor systems generate a huge amount of heat in their operation. Such heat, if not dissipated effectively, will result in aging of insulation materials, degradation of motor performance, and even burnout accidents. It is thus of significant importance to develop effective thermal management means for high-power motor systems, protecting them from any adverse thermal states at various discharging conditions and room temperatures. This research is based on thermal characteristics of high-power electric motors and their accessories, and focuses on 1. innovative, high-efficiency and low-weight thermal management means for high-power electric motors working in confined space; 2. comprehensive network-based thermal management analysis and optimization for energy platforms integrating motors with other energy conversion devices.</p>
Contact points	Informal inquiries may be addressed to Dr Yong Shi (Yong.Shi@nottingham.edu.cn) and Prof Jiqiang Wang (wangjiqiang@nimte.ac.cn), but formal applications should follow the instructions in 'How to apply' section.