

Research project and supervisory team

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Short introduction & description of research project	<p>Porous materials such as zeolites, activated porous carbons and porous coordination polymers have attracted considerable attention over the years. Among these sorbent materials, coordination polymers known as Metal-Organic Frameworks (MOFs) have stood out as the most desirable due to their unique properties. The use of different varieties of metals feedstocks and organic linkers gives MOFs the advantage of possessing functional tunable pore sizes, structural frameworks and with some MOFs reported to even possess ultrahigh surface areas of up to 10 000 m²/g. These properties make MOFs ideal for applications in gas storage and separation and other energy-related applications. Despite these attractiveness, MOFs scalability and commercialisation endeavours still face limitations due to their high cost of production and scarcity of environmentally friendly feedstock. Therefore, the essence of this project is to explore unconventional feedstocks for the sustainable production of MOFs at low cost. The project is divided into two phases, as follows: Phase 1 will focus on the laboratory-scale synthesis and screening of potential MOF candidates from various unconventional feedstocks (industrial metal-rich waste, mining operations metal-rich effluents/wastes and raw natural resource feedstocks as well as unconventionally sourced organic linker molecules). Phase 2 will concentrate on the semi scale-up endeavours of the MOF type that shows the highest potential and replicability from phase one of the project. In both phases, the resulting MOFs will be thoroughly characterised and tested for application in either gas storage or separation.</p>
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