



Curtin University



Faculty of Science and Engineering

2020 Australian Government Research Training Program Scholarships

Strategic Project Profile

PROJECT TITLE: Thermal Battery Development

FIELD OF RESEARCH CODE: 0912

PROJECT SYNOPSIS:

This PhD is directed towards developing high temperature materials that store thermochemical energy for large-scale solar thermal plants so they can operate 24/7. New gas-solid energy storage materials will be synthesised and catalysed by mechanochemical and wet-chemical methods. The thermochemical materials may be metal carbonates that release/store CO₂ or metal hydrides that release/store H₂ gas. The gas-solid reactions will be conducted from 773 - 1273 K. The thermochemical properties of these materials (i.e. enthalpy and entropy) will be determined and they will be tested in prototype test facilities for gas-solid reactions during thermal cycling, simulating a full-scale solar facility. The technology will be directed towards up-scaling to realise multi-kg test beds. The PhD will be conducted in the Hydrogen Storage Research Group (HSRG) within the Fuels and Energy Technology Institute (FETI) at Curtin University, which is equipped with an array of world-class research equipment and facilities. You will specialise in materials science, X-ray diffraction, electron microscopy, and other characterisation techniques.

FEASIBILITY AND RESOURCING – DESCRIPTION OF THE SUPPORT THIS PROJECT WILL RECEIVE:

The project is to be conducted within the Hydrogen Storage Research Group (HSRG) and Fuels and Energy Technology Institute (FETI) and will be supported through ongoing funding for equipment and consumables. The project feasibility is satisfied through the extensive expertise of the HSRG over the last 16 years and the equipment and resources already in place. This includes a state of the art Hydrogen Laboratory in Building 301 at Curtin.

WHAT MINIMAL ATTRIBUTES AND SKILLS EXPECTED BY THE CANDIDATE BE COMPETITIVE:

The student will have a strong background in materials science, with a focus in physics, chemistry, or engineering. A history of materials synthesis, characterisation, and scaling will be preferred. The candidate will ideally have a research history within the materials field and any publications and research achievements will be highly valued. Good communication skills will be key to working with this diverse team of scientists.

THE SIGNIFICANCE OF THE PROJECT/ PROGRAM FOR THE ENROLLING SCHOOL OR INSTITUTION:

This research project will significantly contribute to the Australian Scientific and Research Priorities for Energy of which the targets are to face the challenges of new clean energy sources and storage technologies that are efficient, cost effective and reliable. The project also encompasses the priorities of Curtin, the Faculty of Science and Engineering, and the Fuels and Energy Technology Institute by developing new technologies to store energy.

Students are advised to contact the Project Lead listed below prior to submission of their scholarship application to discuss their suitability to be involved in this strategic project.

PROJECT LEAD CONTACT

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