MONASH University

MONASH
ENGINEERING

Faculty of Engineering

ASPIRE Summer Research Program 2026-2027

Project Title: Development of Versatile Coated Monolitic Catalysts for CO2 Reduction (Continuation)

Supervisor: Prof Akshat Tanksale

Department: Department of Chemical & Biological Engineering

Email: akshat.tanksale@monash.edu

Website profile of project supervisor:https://www.monash.edu/engineering/akshattanksale

Objective

The main objective of this project is to assess the feasibility of scaling out a modular induction-heated reactor system through a multi-stacked pancake coil design. This involves determining how additional reactor modules can be added by stacking coils to increase overall system capacity, while maintaining or reducing the energy consumption per module. The findings will inform the design considerations required to progress this technology toward industrial-scale production.

Project Details

This project builds on the reactor system developed for the Versatile Coated Monolithic Catalysts for CO2 reduction project, but is scoped independently of that Final Year Project. Rather than evaluating catalyst performance or CO2 conversion chemistry, this Summer Research Project focuses on the engineering feasibility of scaling the reactor hardware itself.

This project will investigate whether multiple pancake coils can be stacked to form a multi-module reactor system, effectively multiplying capacity without a proportional increase in energy input per module.

Project Timeline

TASK		2	3	4	5	6	7	8	9	10
Conduct a literature review on induction heating coil design, multi-coil/stacked coil configurations, and modular reactor scale-out approaches.										
Become familiar with the current reactor set-up, induction heating equipment, and laboratory safety procedures. Review existing single-coil performance data (energy consumption, heating profile) to establish a baseline.										
Design the experimental plan for testing stacked coil configurations. Identify key parameters to vary (e.g. coil spacing, number of stacked modules, power input) and define success metrics.										
Construct/assemble a multi-stacked coil test configuration. Conduct controlled experiments comparing single-module vs multi-module performance under baseline operating conditions.										
Conduct further experiments varying key stacking parameters to optimise heating uniformity and minimise energy consumption per module as modules are added.										
Analyse and compare experimental data across configurations. Assess the feasibility of scale-out and identify constraints or design recommendations for industrial-scale implementation										
Compile findings in a final report and present project outcomes.										

Prerequisites N/A

Student Placement Agreement

A student placement agreement must be signed by the project supervisor and the student prior to commencement of the ASPIRE program.

LV0554-72741 ASPIRE Program Co-Curricular-Student-Placement-Agreement-Short-term.docx

Commented [1]: We do not have acess to these links