EDITH COWAN UNIVERSITY

PROJECT DETAILS

Project Title:

Development of Copper-Based Catalysts for Ethylene Production in the Electrochemical Reduction of Carbon Dioxide Gas.

Project Summary:

Climate change is one of the greatest threats that the world is currently facing, and it is directly caused by the high emissions of greenhouse gases, such as carbon dioxide gas. In 2025 the concentration of CO_2 gas is now at an alarming 427 ppm. Reducing CO_2 levels is crucial.

This project aims to utilise electrochemical reduction method to convert CO_2 gas into other useful molecules, such as ethylene, and thus reduce the amount of CO_2 in the atmosphere by developing novel catalysts using Radio Frequency magnetron sputtering technique.

The expected outcomes of this project are the successful production of copper-based sputtered catalysts, which will increase selectivity towards the production of ethylene gas and ultimately apply these new catalysts in an industrial setting to contribute to global efforts of reduction CO_2 levels.

Preferred Applicant Skillset:

This project will require a student who has a chemistry degree or equivalent. Students with a chemistry major ideally in analytical and/or physical chemistry field or chemical engineering students would be preferred. Desirable skills and experience for this project include;

- Using gas chromatography and scanning electron microscopy instruments,
- Working with gas bottles,
- Experience using electrochemical cells and measuring thin films.

Additional capabilities that would be beneficial for this project are; understanding of vacuum systems and how vacuum pumps work, self-motivated, strong organizational and computer skills and ability to collaborate with various research groups.

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