

An Indian-Australian research partnership

Project title: Corrosion control at the nanoscale for light alloys

Project number: IMURA0092

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Research Academy theme/s

List only the research academy theme/s that is relevant to the project
Nanotechnology **XXXX**

The research problem

Corrosion of most alloys is a very localized phenomenon, with initiation and propagation often dictated by nanoscale microstructural heterogeneities that can have markedly different electrochemical properties than the matrix. Measurement of the electrochemical properties phase-by-phase on the nanoscale in real alloys is critical to understanding the microstructure-corrosion relationship and subsequently controlling it via alloy design. In regards to light alloys (i.e. those based on aluminium) this is particularly significant, since the microstructure of such alloys are deliberately heterogenous - in order to develop an appropriate level of strength.

Project aims

This project aims to measure the local electrochemical engineering alloys on the nanoscale using advanced scanning probe microscopy techniques. Following this, the knowledge will be ported into an alloy development program for the production of alloys with enhanced corrosion resistance.

Expected outcomes

The ability to probe the response of nanoscale features is the first step in the development of materials on a fitness-for-purpose basis.

Which of the above Theme does this project address?

5. Nanotechnology

How will the project address the Goals of the above Themes?

Modern advances in technology place particular emphasis on both understanding and controlling phenomena on the nanoscale. This project deals with understanding the materials behaviour at the sub-200nm length scale, and using this knowledge in the ultimate development of advanced materials.