Project Title:
‘Geoscience Australia, RMIT University & Monash University Joint Research Project on Australia’s Critical Mineral Potential’

Project Description:
Critical minerals (antimony, barite, beryllium, bismuth, cesium, chromium cobalt, germanium, indium, lithium, manganese, niobium, platinum-group metals, potash, rare earth elements, rhenium, rubidium, scandium, strontium, tantalum, tellurium, rhenium, tungsten, vanadium, etc.) are pivotal to human society with prominent economic and strategic significance for industrialised and developing economies.

Most critical minerals have been proven to be irreplaceable components of numerous emerging technologies and essential industrial advancements, especially renewable energy systems, electric vehicles, rechargeable batteries, consumer electronics, telecommunications, specialty alloys, and defense technologies. It is clear that the supply of critical minerals is an area of promising growth potential, based on increasing technological demands and uses at a global level (e.g. renewable energy, consumer electronics, energy storage, military hardware).

Australia is one of the principal producers of various mineral commodities in the world (e.g. bauxite, copper, lead, gold, ilmenite, iron ore, nickel, rutile, zircon, and zinc). Critical minerals are typically recovered as ‘by/co-products’ from the production of primary commodities (e.g. indium from zinc concentrate) and are critical to varying extents for most industrial economies (e.g. USA, China, Japan, European Union, etc.). Endowed with extensive potential critical minerals resources, world-leading expertise in the areas of both mining and metallurgical processing; this is a clear opportunity for Australia to develop itself as an essential, transparent and reliable supplier of critical minerals for the evolving global economy.
This joint research program aims to provide essential scientific services for the successful realization of value from Australia’s critical minerals opportunity through:

A. Preparing a comprehensive scientific review of the current knowledge base of Australia’s critical minerals potential, including: mineral criticality assessment methodologies, geological knowledgebase for Australia’s critical mineral resources endowment, global critical mineral supply and demand, the potential economic perspectives and main scientific impediments, to underpin essential challenges for the successful fulfillment of Australia’s critical minerals potential. [Complete]

B. Obtaining and analyzing samples of base metal concentrates and tailings from across Australia to establish an empirical geochemical database to support novel numerical models for critical minerals resources and recoverability assessments for Australia’s Ni, Pb-Zn, IOCG mines, and deposits. [In Progress]

C. Developing new algorithms of economic cost models for selected projects (Cu-Au, Pb-Zn-Ag etc.). These models will comprise reasonable estimates on development and mining costs with detailed instruction and documents of inputs and uncertainty analysis with further capacity to be integrated into Geoscience Australia’s map of Economic Fairways. [In Progress]

Call for Concentrate and Tailings Samples to Test:

As part of this research project, we are keen to obtain samples of base (or precious) metal concentrates and tailings which can be tested through GA using the OSNACA geochemical protocol. In this way, we can develop a database of critical minerals in concentrates and link this to geology, mineral deposit type and potentially processing. This work will help to underpin the opportunity to recognize greater economic value from its critical minerals within existing mineral resources and mining projects.

For more details and to help by providing samples to be tested, please contact Dr David Huston (GA) or Dr Zhehan Weng (RMIT).
Chief Investigators:

Assoc. Prof. Gavin Mudd¹, Gavin.Mudd@rmit.edu.au, Tel: +61 3 9925 3209;
Assoc. Prof. Mohan Yellishetty², Mohan.Yellishetty@monash.edu, Tel: +61 3 990 27143;
Dr David Huston³, David.Huston@ga.gov.au,

Collaborators:

Dr Zhehan Weng¹, Zhehan.Weng@rmit.edu.au, Tel: +61 3 9925 3209;
Dr Stuart Walsh², Stuart.Walsh@monash.edu, Tel: +61 3 990 59419;
Dr Anna Lintern², anna.lintern@monash.edu, Tel: +61 3 9905 4676
Dr Stephen Northey², Stephen.Northey1@monash.edu, Tel: +61 488 011 132;
Mr. Ye (Eric) Yuan², Ye.Yuan@monash.edu, Tel: +61 3 990 54967;
Dr Sarlae McAlpine³, Sarlae.McAlpine@ga.gov.au
Dr Karol Czarnota³, Karol.Czarnota@ga.gov.au;
Dr Richard Blewett³, Richard.Blewett@ga.gov.au,
Dr Roger Skirrow³, Roger.Skirrow@ga.gov.au,
Dr Budd Anthony³, Anthony.Budd@ga.gov.au

¹Environmental Engineering, School of Engineering, RMIT University, Melbourne, VIC 3000
²Resources Engineering, Department of Civil Engineering, Monash University, Clayton, VIC 3800
³Minerals Division, Geoscience Australia, Symonston, ACT 2609
Some Relevant Publications:


