

## Critical Mineral By-Product Potential

The Australian Critical Minerals Research and Development Hub is developing methodologies and tools to help understand Australia's geological resource potential for by-product critical minerals and lead research into development opportunities.

### Why are we researching critical mineral by-products?

Approximately 50% of the critical minerals on Australia's Critical Minerals List are co-products or by-products of major commodities such as copper, zinc, lead, nickel and aluminium. Examples include germanium, gallium and indium in zinc ores and gallium in bauxite ores.

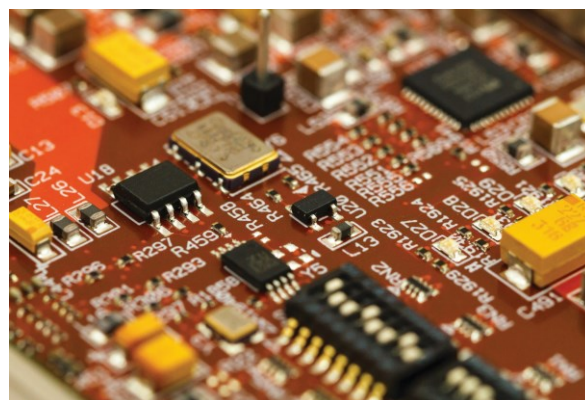
These critical minerals are strategically important and are essential to a range of modern technologies, however they have small markets and highly concentrated supply chains. Researching by-products will give us greater insights into Australia's supply chain potential.

### What is currently done with the by-product?

By-products occur due to the geochemical and geological associations of elements within a mineral deposit. They are often not considered 'material' to the economics of resource extraction and companies are therefore not obligated to report on grades or transactions.

By-products are also not often captured in the refining process in Australia. Consequently, a knowledge gap exists regarding Australia's potential resources, reserves and ability to produce these vital critical minerals.

Despite ranking first and third for global production of bauxite and zinc respectively, none of Australia's bauxite refineries separate gallium and none of Australia's zinc smelters produce gallium, germanium or indium. It is unclear whether the by-products are exported with the concentrates or discarded with tailings.



By-product critical minerals such as gallium are important for advanced modern technologies like semiconductors.

## The Australian Critical Minerals Research and Development Hub's by-product project

The Australian Critical Minerals Research and Development Hub brings together expertise from Geoscience Australia, the Australian Nuclear Science and Technology Organisation (ANSTO) and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) to address technical challenges and drive collaborative research across the critical minerals value chain to support clean energy and Australia's net zero policy agenda.

### Geoscience Australia – Quantifying Australia's by-product resource potential

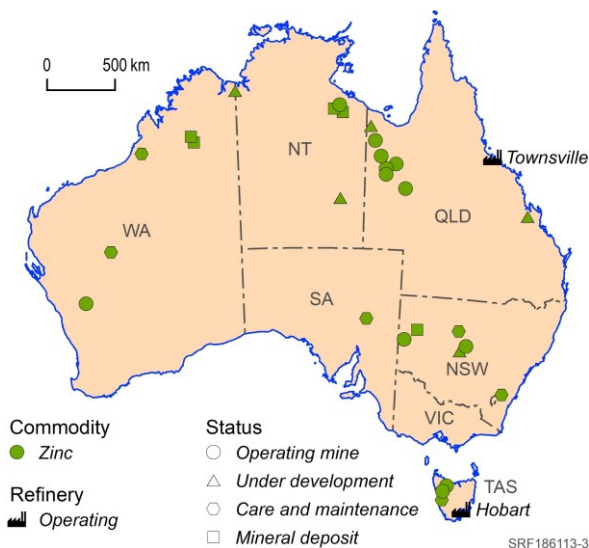
As part of the project, Geoscience Australia will:

- Complete a statistical analysis of the geochemical associations of gallium, germanium and indium in Australian zinc deposits, informing a methodology to predictively quantify Australia's resource potential for by-products in mineral deposits.
- Collect samples and data to strengthen the statistical analysis and provide opportunities to benchmark the predictive outputs.
- Develop a tool to produce up-to-date assessments of Australia's critical minerals by-product resource potential.
- Collaborate with industry to understand the current extent of by-product critical mineral processing and to identify future opportunities for Australia.

### ANSTO – Assess and validate approaches for germanium and gallium recovery

As part of the project, ANSTO will:

- Undertake desktop studies to identify process options for the recovery of germanium from the processing of zinc ores and the recovery of gallium from the processing of bauxite ores.
- Complete test work to develop technologies and know-how for the recovery of germanium and gallium.



Locations where new zinc ore samples will be collected to strengthen the statistical analysis.

### CSIRO – Techno-economic assessment for the recovery of germanium and gallium

As part of the project, CSIRO will:

- Undertake a high-level techno-economic evaluation to assess the opportunities for Australia to produce germanium and gallium from existing operations.
- Estimate and report the expected capital and operating costs of producing germanium and gallium.

*This work has been supported by the Australian Critical Minerals Research and Development Hub whose activities are funded by the Australian Government.*

#### Learn more

Australian Critical Minerals R&D Hub website



#### Contact us

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