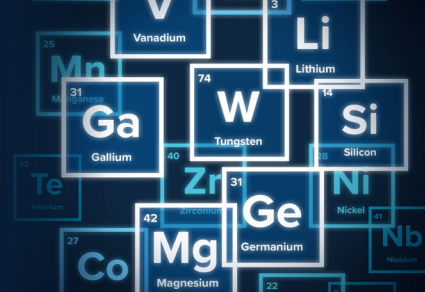


Current Research Projects Overview



Science, Research and Innovation

Accelerate the development of Australia's critical mineral resource endowment. Support energy, defence and technology industries. Build diverse, secure and sustainable supply chains with international partners.

VISION

MISSION

STRATEGY

Delivering Technical Breakthroughs

Build capabilities and downstream industries onshore. Help de-risk commercial projects and attract international investment and partnerships. Provide trusted information and advice to Government and leadership to Australia's R&D community.

The Australian Critical Minerals R&D Hub is hosted by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and was established in October 2022. Under this initiative, Australia's leading science agencies, Australia's Nuclear Science and Technology Organisation (ANSTO), Geoscience Australia, and CSIRO, are working collaboratively to develop urgent technical solutions needed to achieve the vision of the Critical Minerals Strategy 2023-2030 and Future Made in Australia plan.

LEADING SCIENCE AGENCIES

**Commonwealth Scientific
and Industrial Research
Organisation (CSIRO)**

Geoscience Australia

**Australian Nuclear
Science and Technology
Organisation (ANSTO)**

CSIRO



ANSTO

AUSTRALIAN
**critical
minerals**
RESEARCH & DEVELOPMENT HUB



CAPABILITY



CONNECTION



COLLABORATION

Capability

Scaling-up and commercialising critical minerals research and development.

Connection

Connecting the critical minerals R&D ecosystem, linking industry to R&D solutions, informing policy.

Collaboration

Supporting strategic international critical minerals collaboration.

KEY STRATEGIC PILLARS

Working with the Critical Minerals Office at the Department of Industry, Science and Resources (DISR), the Hub projects were developed in response to Australia's policy objectives and strategic priorities.

Value-adding/creating new industries: Develop sovereign processing technologies and create Intellectual Property needed to develop Australia's critical minerals resource endowment and industrial base, de-risk projects and attract potential foreign investment/partners.

Fill priority R&D gaps that would not be solved by the market in the immediate future, which are critical to Australia's national interests and the energy transition.

Develop R&D needed to secure the most concentrated international supply chains for materials essential to modern technologies that are most vulnerable to disruption.

Develop innovative ESG solutions that meet expectations of trading partners.

Increase the knowledge base needed to support data-driven decision-making on mining and processing of critical minerals ore bodies in Australia.

OBJECTIVES

PROJECTS



Research projects are collaborative, with all three agencies contributing their expertise and scientific infrastructure to deliver technical breakthroughs.

The Hub is also building strategic international R&D partnerships that will accelerate the development of technical solutions and promote Australian innovation with international investors. Current projects are:

- Mineral Criticality Assessment
- High Purity Silica/Quartz (HPS/HPQ)
- High Purity Alumina (HPA)
- Accelerating the Development of Australia's Rare Earth Resources
- Extracting Mineral By-Products
- Producing High Tech Metals and Materials

PROJECT

High Purity Silica/Quartz (HPS/HPQ)

GOAL

Accelerate the development of Australia's silicon industry by advancing the knowledge of mineral systems and enabling high-value processing by developing technology, facilities and know-how required to produce HPQ in Australia for supply to high-tech global markets.

HUB OBJECTIVES



CHALLENGE/ OPPORTUNITY

- Silicon is used in many high-tech applications like electronics, solar panels and electric vehicles. HPQ, the purest and most valuable form, is used in the manufacture of semi-conductors and other high-tech and defence industries and is essential for the production of fused glass crucibles, an essential component in making polycrystalline wafers for solar cells.
- The International Energy Agency expects demand for silicon to increase from 816.2 kt in 2022 to 2,200.5 kt by 2050, driven by solar PV and electric vehicles, which presents a significant opportunity for Australia.
- While silica is an abundant mineral, it is challenging to find high purity resources needed for the production of silicon using available geological data and techniques. Detailed mineral studies are required to enable commercial exploration, discovery and development of HPS production in Australia.
- HPQ must be 99.997% pure, containing few impurities. Purification of quartz to this level requires extensive processing including exposing the mineral to chlorine gas at $>1000^{\circ}\text{C}$. There are few facilities available outside Germany and China that can complete this processing step.



A high temperature chlorination processing facility, the penultimate chemical processing step for quartz

PROJECT STATUS

- Geoscience Australia is developing a mineral systems model which will predict and identify deposits that have the greatest economic potential to supply high grade silicon.
- This project is investing in a high temperature chlorination processing facility which will allow processing and testing of Australian quartz samples to temperatures between $300-1200^{\circ}\text{C}$.
- This infrastructure is located at ANSTO at Lucas Heights and will enable Australian companies to test samples, verify purity levels and supply their material to lucrative high-tech markets. The facility, analytical services and know-how developed under this project will be available to project proponents, giving Australia a competitive edge in this market.



SUPPLY CHAIN

EXPLORATION | DISCOVERY

EXTRACTION

MID-STREAM PROCESSING

MANUFACTURING

