



# High Purity Silica

## Mineral potential study

High purity silica is the only naturally occurring and economically viable feedstock for the production of silicon, a critical mineral and key component in advanced modern technologies such as semiconductors and solar panels.

### Supply and demand

In 2022, the high purity silica (HPS) market was valued at nearly \$894.6 million USD and is estimated to grow to \$1.5 billion USD by 2031.

The forecast increase in demand for silicon, and thus the HPS feedstock, is primarily driven by the solar photovoltaics industry for renewable energy production, supporting the global transition to a net zero carbon future.

To meet net zero goals, the global demand for HPS is projected to increase almost 40-fold by 2050.

Currently, the largest mine producing HPS is in the USA. The Spruce Pine pegmatite in North Carolina accounts for up to 70% of the global supply.

Western Australia's Simcoa is Australia's only HPS mining and silicon production operation, producing around 50 kilotons of silicon in 2023.

### Ensuring future supply

While silica is the second most common mineral compound in the Earth's crust, finding silica with the required purity needed to develop high-tech applications remains a challenge due to its rarity.

Australia has a range of geological settings and source rocks, including pegmatites, hydrothermal quartz veins, sedimentary accumulations, and quartzite that could meet the required purity and scale to be suitable feedstocks for silicon production.

However further research is needed to understand the geological factors and the geochemical and geometallurgical characterisation of HPS deposits to better understand the mineral systems most prospective for HPS in Australia.



Sampling for HPS in Mt Isa and Cloncurry

# HPS Projects under the Australian Critical Minerals R&D Hub

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

## Geoscience Australia – Mineral potential study

Geoscience Australia is undertaking a detailed national mineral potential study of HPS to identify the favourable geology and regions across Australia that have the greatest potential to supply raw material suitable for the production of silicon.

The goal of this study is to stimulate exploration and discovery of HPS and support the development of a downstream silicon industry in Australia.

As part of the project, Geoscience Australia is:

- Undertaking a summary review of the state of the HPS industry, exploration and deposit styles in Australia.
- Delivering a mineral potential assessment to identify the regions of Australia that have the greatest potential for the discovery of suitable HPS deposits.
- Defining controls on targeted HPS mineral systems and determining relevant datasets to support the mineral potential assessments.
- Identifying required analytical techniques to deliver an 'Explorer's Toolbox' that will guide explorers through the analytical processes required to discover and define high-quality mineral deposits.



Figure 1. Known HPS operations, deposits, exploration targets and occurrences in Australia

## ANSTO – HPS Process and Product Development

ANSTO is developing processing routes for high purity quartz (HPQ; quartz is the most common type of silica) production from Australian quartz and silica sand projects, complementing the Geoscience Australia mineral potential study.

This project will provide access to the technologies and know-how required for HPQ production, in particular, high temperature chlorination for all future Australian projects.

### Learn more

Read our paper on HPQ



Australian Critical Minerals  
R&D Hub website



### Contact us

Email [clientservices@ga.gov.au](mailto:clientservices@ga.gov.au)

Phone 1800 800 173

Website [ga.gov.au/](http://ga.gov.au/)

