



NSW DEPARTMENT OF
PRIMARY INDUSTRIES

This document is part of a larger publication and is subject to the disclaimers and copyright of the full version from which it was extracted. Information on purchasing the book, and details of other industrial minerals, as well as updates and copyright and other legal information can be found at:

<http://www.dpi.nsw.gov.au/minerals/geological/industrial-mineral-opportunities>

Potential and Outlook

Staurolite is typically produced in the processing of mineral sands. The potential for staurolite in New South Wales appears to be confined to the regionally metamorphosed rocks of the Broken Hill region. There, the recovery of staurolite as a by-product of the mining of garnet and other commodities may be feasible.

Within the Broken Hill region (Figure 27), staurolite occurs in zones of retrograde metamorphism. Staurolite-rich schists and gneisses have been recorded at a number of localities and some of these may have potential for staurolite production.

Staurolite could be expected to occur as a minor constituent of the heavy minerals suite in mineral sands beach placers in the Murray Basin, particularly in areas adjacent to the Broken Hill Block. However, it is doubtful that concentrations would be high enough to make recovery economically attractive.

Nature and Occurrence

Staurolite, $\text{Fe}_2\text{Al}_9\text{Si}_4\text{O}_{22}(\text{OH})_2$, is an iron–aluminium silicate commonly found in schists and gneisses formed by regional metamorphism of argillaceous sedimentary rocks. It also occurs as a detrital mineral in sediments derived from the erosion of such rocks and may be present in economically significant concentrations in beach or alluvial mineral sands placer deposits.

Staurolite is produced commercially as a by-product from mineral sands placer deposits. Production varies with fluctuations in the production of titanium minerals and zircon.

There is only a small number of producers throughout the world. The USA is the major source (from deposits in Florida). Harben (1999) stated that capacity in the USA was 80 000 tpa to 100 000 tpa. Staurolite is also produced in Australia, Ukraine, Russia and India.

Main Australian Deposits

The only producing source of staurolite in Australia is the Cooljarloo mineral sands placer deposit in the Perth Basin, in southwestern Western Australia. The deposit is mined by the Tiwest Joint Venture as a source of titanium minerals

and staurolite. The staurolite, which constitutes about 5% of the mineral sand concentrate, is recovered as a by-product from the waste stream at the Chandala dry separation plant, near Muchea (Fetherston 2002). Although large quantities of rutile, zircon and ilmenite are produced, the amount of staurolite obtained is unknown.

New South Wales Occurrences

Staurolite occurs within retrograde metamorphosed schists and gneisses in the Broken Hill region (Figure 27). Occurrences of staurolite-rich rocks have been recorded in a number of localities (e.g. near Acacia Vale).

Detrital staurolite may occur as a minor constituent of mineral sands placer deposits in the Murray Basin, particularly near the Broken Hill Block.

Minor staurolite occurrences have been recorded in the Albury area in the southern part of the state.

Applications

The uses of staurolite are based on its hardness (7–7.5), moderate specific gravity, low thermal expansion, high melting point (1537°C), and its resistance to weathering and chemical attack.

The main uses of staurolite are as an abrasive, particularly in sandblasting, and as foundry sand. Minor uses include cutting and etching monumental stone, as filler material (staurolite flour) in paint primers and as a source of alumina for cement production. In rare instances, it may be used as a gemstone.

Economic Factors

Potential for growth in the market demand for staurolite is constrained by its limited availability.

References

- FETHERSTON J.M. 2002. Industrial minerals in Western Australia: the situation in 2002. *Geological Survey of Western Australia*, Record **2002/12**.
- HARBEN P.W. 1999. *The industrial minerals handybook*. 3rd edition. Industrial Minerals Information Ltd, London.

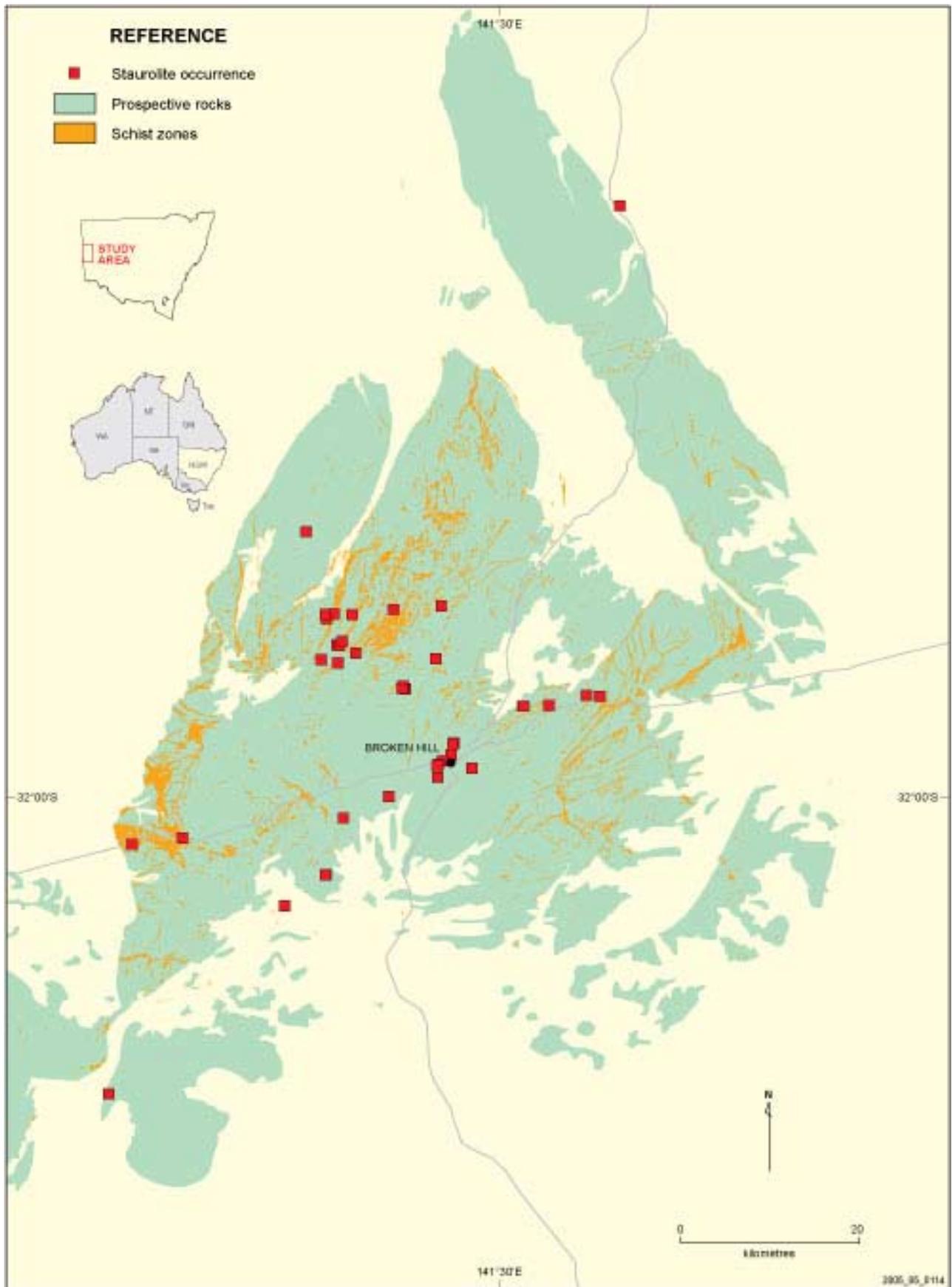


Figure 27. Staurolite occurrences in the Broken Hill area