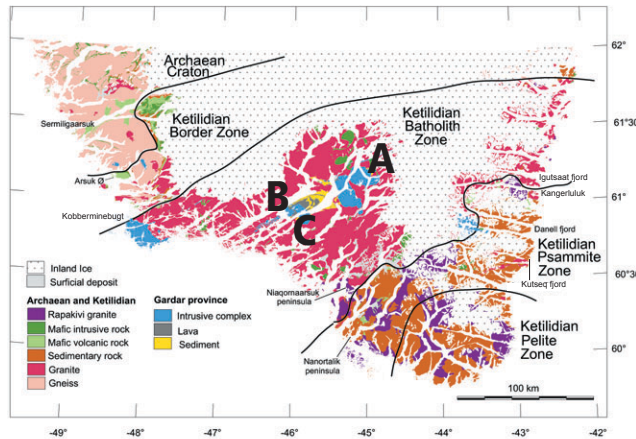


Deposits of speciality metals in South Greenland

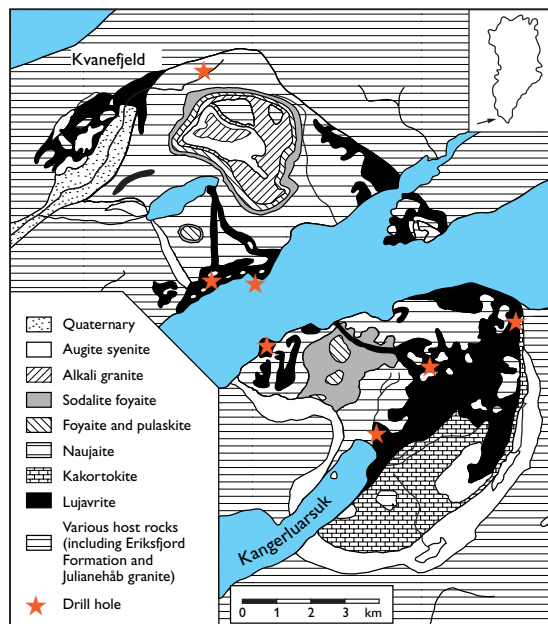


Geological environment and location

Speciality metals in South Greenland are found almost exclusively in peralkaline/alkaline intrusions of the Proterozoic Gardar age, 1300–1120 Ma.

Major commodities include:

- Tantalum, Loc. A
- Niobium, Loc. A, B
- Zirconium, Loc. C
- Yttrium, Loc. C
- Rare Earth Elements, Loc. B, C
- Beryllium, Loc. B
- Speculative commodities, Loc. B



A treasure of speciality metals within the Ilímaussaqa intrusion

The Ilímaussaqa intrusion is one of the Gardar intrusions with an age of 1186 Ma. The complex has been known since 1806, but comprehensive descriptions appeared much later – and over a large period of time – in 1912, 1957 and 1964. Since its discovery the complex has attracted researchers and explorationists worldwide.

The Danish State took over exploration for radioactive elements from 1955–1982. The complex was drilled in 1962 resulting in seven drill holes (* on the map).

A fan of rare metals and elements is recognised within the complex: U, Th, Nb, Ta, Zr, Y, REE, Li, Be.

Tantalum in the Motzfeldt complex

The Motzfeldt Centre is one of the Gardar intrusions (1310 Ma). Pyrochlore accumulations in the Motzfeldt syenite show significant grades of Ta.

The deposit at Motzfeldt is a typical 'low grade - large tonnage' type of resource. 600 million t of ore with c. grades of 120 ppm Ta are the figures based on major investigations carried out by the Survey (GEUS). High grade zones carries up to 426 ppm Ta. Company exploration has now taken over what is believed to be one of the largest Ta deposits in the World.



Niobium at Motzfeldt and Kvanefjeld

The Motzfeldt Centre Ta deposit is located in mineralised syenite. Additionally a Nb resource of at least 130 million t with 0.4–1.0% Nb₂O₅ is known.

The Kvanefjeld uranium deposit has an additional potential for Nb, settled in several rare minerals



(e.g. pyrochlore and epidote) partly in the ore and in associated veins. Resource estimates are not available.

Zirconium and Yttrium at Kangerluarsuk

Deposit are found in Zr- and Y-rich apgaitic rocks within the Ilímaussaq intrusion, where Zr, Y and REE are accumulated in the mineral eudialyte. The host rock – kakortokite – is a layered rock, where the eudialyte is enriched in 29 separate layers. Eudialyte is a complex Zr–silicate. The ZrO_2 content



is c. 14%, and the $(Ce,La,Y)_2O_3$ content is c. 3%. Y element can reach 4000 ppm.

Eudialyte accumulations carry a potential for exploitable amounts of Zr, Y, REE and Nb. Estimated resources of +2 million t ore with an average of 3% ZrO_2 are located. Peak values of 6% ZrO_2 , 0.2% Y_2O_3 , 3% REE_2O_3 and 0.2% Nb_2O_5 are at hand.

Beryllium at Kvanefjeld

The Ilímaussaq intrusion rocks have an average Be content of 30 ppm. Be is located in a suite of rare minerals ranging in mineral content from more than 40% BeO (beryllite) to about 5% BeO (tugtupite).

In the Kvanefjeld area a rough estimate indicates a resource of 180,000 t rock with 0.1% Be.



Tugtupite (pink)



Speculative commodities at Kvanefjeld

Lithium is enriched in the apgaitic rocks of the Ilímaussaq intrusion. Values of Li in the Kvanefjeld deposit are found between 600–1900 ppm. An estimated resource in the Kvanefjeld deposit counts 235,000 t Li.

Summary of potential for speciality metals

South Greenland has an obvious potential for speciality metals. Characteristically both 'large tonnage low grade' as well as 'low tonnage - high grade' deposits are outlined.

Tantalum takes the lead in the deposit of the Motzfeldt Centre with more than 600 million t of Ta ore grading 120 ppm. Zirconium is found at the exceptional formation at Kangerluarsuk where over 2 million t of Zr ore grading 3% ZrO_2 is located. Additional rare metals are Y, Nb, REE, Be and Li.

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Layout: GEUS, Grafisk
Printers: FROM & CO
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