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Update by Jakob Keiding (Geological Survey of Denmark and Greenland), 10 January 2023

Commodity	Niobium (Nb)	Data source
Significance for the EU (2023)	<i>Critical, not strategic</i>	
Uses of the commodity	<p><u>Main uses:</u> <i>Steels 86 % – ferroniobium feedstock used; high-strength low-alloy steel (HSLA)</i></p> <p><u>Minor uses:</u> <i>Aerospace applications ('superalloys'), hard-cutting tools, radio engineering, electronics, chemical apparatus, atomic energy, refractory materials, optical glass, catalysts.</i></p> <p><u>Future uses:</u> <i>Superconducting technology, magnets, superalloys. The extensive use of ferroniobium in the production of steel means that future demand is likely to be driven by the construction and automotive sectors.</i></p>	USGS (2019), Latunussa et al. (2020)
Resources and potential in Nordic countries	<p><i>Known resources: Finland: 113,000 t, Greenland 5,900,000 t, Norway 22,000 t, Sweden 38 500 t.</i></p> <p><i>Resource potential:</i> <u>Finland:</u> <i>A large potential in the Sokli deposit</i> <u>Greenland:</u> <i>Additional major potential</i> <u>Norway:</u> <i>Moderate to major potential</i> <u>Sweden:</u> <i>Potential exists in several types of mineral deposits.</i></p>	Thrane et al. (2016), Eilu et al. (2022), Jonsson et al. (2022), Rosa et al. (2023)
Anthropogenic resources and potential in Nordic countries	<i>Thermal recovery of niobium from aluminium waste</i>	
Main deposit types in Nordic countries	<i>Peralkaline intrusions, carbonatites, pegmatites</i>	Eilu et al. (2022), Rosa et al. (2022)
Global production (2022)	<i>79,000 t Nb</i>	USGS (2023)
Nordic production	<i>None</i>	
Main producing countries (2023)	<i>Brazil 89.9 %, Canada 8.2 %</i>	USGS (2023)
Main global deposit types	<i>Carbonatites (most of the known resources), columbite-pyrochlore alkaline granites, loparitic urtites, monazite-pyrochlore lateritic and residual crusts of carbonatites, talus-alluvial placers, pegmatites</i>	London (2017), USGS (2019, 2023)
Technological challenges in production	<i>Radioactive elements and complex mineralogy in the ore.</i>	USGS (2019)
Recycling	<p><u>Present:</u> <i>Wastes of niobium production: screening of powders, marriage ingots, splines. Waste and scrap of niobium-containing steel, waste output capacitors. However, the amount of Nb physically</i></p>	USGS (2019, 2023), Latunussa et al. (2020)

recovered from steel scrap, which dominates the Nb recycling, is small.

Future:

The increase in the volume of the secondary use of niobium-containing alloys as charge, alloys.

References

- Eilu, P., Hallberg, A., Bergman, T., Bjerkgård, T., Reginiussen, H., Sandstad, J.S. 2022. Nordic Ore Deposit Database. Annual update (end-2021 data). <https://gtkdata.gtk.fi/fmd/>
- Jonsson, E., Törmänen, T., Keiding, J., Bjerkgård, T., Eilu, P., Pokki, J., Gautneb, H., Reginiussen, H., Rosa, D., Sadeghi, M., Sandstad, J. & Stendahl, H. 2022. Critical metals and minerals in the Nordic countries of Europe: diversity of mineralization and green energy potential. *Geol. Soc. London Spec. Publ.* 526. <https://doi.org/10.1144/SP526-2022-55>
- Latunussa, C.E.L., Georgitzikis, K., Torres de Matos, C., Grohol, M., Eynard, U., Wittmer, D., Mancini, L., Unguru, M., Pavel, C., Carrara, S., Mathieux, F., Pennington, D. & Blengini, G.A. 2020. European Commission, Study on the EU's list of Critical Raw Materials, Factsheets on Critical Raw Materials. 819 p. https://rmis.jrc.ec.europa.eu/uploads/CRM_2020_Factsheets_critical_Final.pdf; doi: 10.2873/92480
- Lauri, L.S., Eilu, P., Brown, T., Gunn, G., Kalvig, P. & Sievers, H. 2018. Identification and quantification of primary CRM resources in Europe. Deliverable 3.1 of the H2020 project SCRREEN. 63 p. Online at: <http://screen.eu/wp-content/uploads/2018/03/SCRREEN-D3.1-Identification-and-quantification-of-primary-CRM-resources-in-Europe.pdf>.
- London, D. 2017. Rare-Element Granitic Pegmatites. *Reviews in Economic Geology* 18, 165–193.
- Rosa, D., Kalvig, P., Stendahl, H. & Keiding, J.K. 2023. Review of critical raw material resource potential in Greenland. MiMa rapport 2023/1. 121 p. <https://doi.org/10.22008/gpub/32049>
- Thrane K. 2016. Kringlerne Tantalum-niobium-rare earth element-zircon deposit. In: Boyd, R., Bjerkgård, T., Nordahl, B. & Schiellerup, H. (eds.) *Mineral Resources in the Arctic*. Geological Survey of Norway Special Publication. p. 176.
- USGS 2019. *Mineral Commodity Summaries 2019*. 200 p. doi.org/10.3133/70202434
- USGS 2023. *Mineral commodity summaries 2023*. U.S. Geological Survey. 210 p. pubs.usgs.gov/periodicals/mcs2023