

FRAME: towards conflict-free Nb-Ta for the European Union

Helge Reginiussen¹, Erik Jonsson^{1,2}, Susana María Timón Sánchez³, Alejandro Díez Montes³, Klemen Teran⁴, Rute Salgueiro⁵, Augusto Filipe⁵, Carlos Inverno⁵ & Daniel P.S. de Oliveira⁵

¹Geological Survey of Sweden (SGU), Department of Mineral Resources, SE-75128 Uppsala, Sweden

²Department of Earth Sciences, Uppsala University, SE-75136 Uppsala, Sweden

³Instituto Geológico y Minero de España, Plaza de la Constitución, n°1, Planta 3ª, 37001 Salamanca, Spain

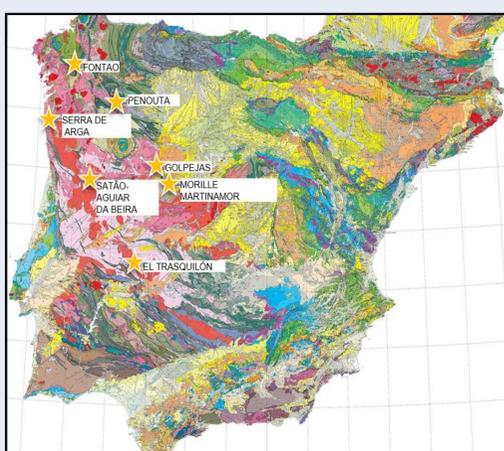
⁴Geological Survey of Slovenia, Dimičeva ulica 14, 1000 Ljubljana, Slovenia

⁵Laboratório Nacional de Energia e Geologia, Apartado 7586, Alfragide 2610-999 Amadora, Portugal

The GeoERA FRAME project focuses on several of the main raw material-related objectives of the EU Commission. FRAME work package 6 (WP6), targets so-called conflict minerals, chiefly those mined to extract niobium (Nb) and tantalum (Ta). These chemically related critical metals are essential components in a range of applications and products including electronics, steel alloys and superalloys widely required by the European industry. Today, significant amounts of Ta and associated Nb are sourced as conflict minerals from the central African region, not least the DRC (Congo-Kinshasa). A main objective of FRAME WP6 is to perform a survey of Nb-Ta occurrences and deposits across Europe and thus enhance their exploration interest and potential to help enable ethical and indigenous production for the EU. The main focus is put on the Swedish part of the Fennoscandian Shield and the Iberian Variscan Massif.

Focus areas - Iberia and the Swedish part of Fennoscandia

The Palaeoproterozoic Nb-Ta mineralisations, and most specifically those enriched in Ta, are typically associated with granites and specifically granitic pegmatites, known from the Palaeoproterozoic bedrock of the Fennoscandian Shield and several younger granites and granitic pegmatite fields in Europe (e.g. the Variscan belt of the Iberian Peninsula and the Massif central of France). Niobium is also present in pyrochlore-group minerals in carbonatitic as well as syenitic rocks, which have a more restricted distribution. In this work package, key areas and deposits on the Iberian Peninsula and in the Fennoscandian shield have been identified as possible candidates for more detailed studies and research. Research on the selected deposits includes field and laboratory studies in which the ore mineralogy of Nb-Ta will be addressed to maximise the usefulness with regards to processing and associated evaluation parameters of their economic potential. Potential by-products, not least of other critical or strategic metals and minerals will be assessed. An important aim of work package 6 is to establish relationships between mineralisations and associated granitic rocks and develop metallogenetic models for their formation. The survey and its outcomes are aimed at forming the basis for developing recommendations for future exploration for these metals in Europe.



The Variscan Iberian Massif

The Nb-Ta mineralisations of the Iberian Peninsula belongs to the southwestern extension of the European Variscan Belt. The most interesting Nb-Ta deposits in Spain are those in which mineralisation occurs in small granites, as it appears in the deposits of Golpejas, El Trasquilón, in some occurrences of the Morille-Martínamor district, Fontao and Penouta. These deposits have been exploited previously for Sn, Ta-Nb, and/or W. In Portugal the mineralisations are located in the northern part of the country and also comprise Variscan granitic rocks and pegmatites.



Penouta, the biggest known Ta-deposit in Spain, was mined intermittently between 1906-1985 and has recently started to reprocess old tailings. Photo: IGME.



Golpejas leucogranite, Spain, showing disseminated cassiterite and columbite-group minerals (black spots). Photo: IGME.



The Swedish part of the Palaeoproterozoic Fennoscandian Shield

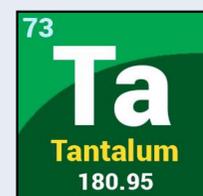
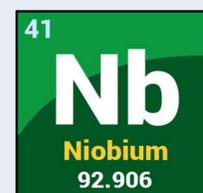
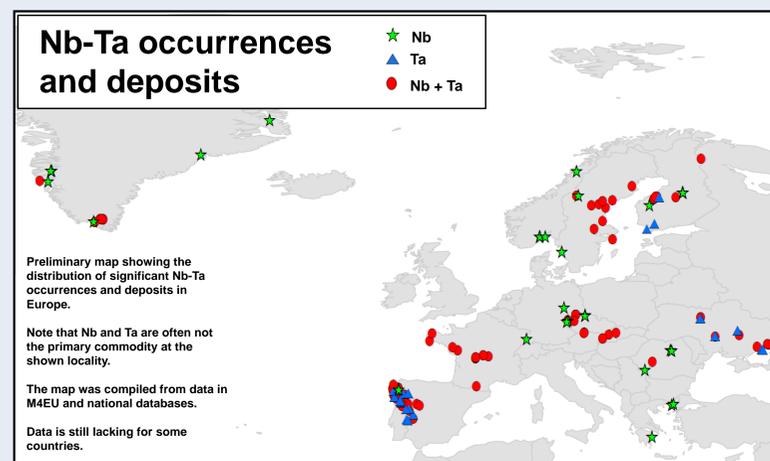
The majority of Nb-Ta mineralisations in Sweden are hosted by LCT-type (lithium-cesium-tantalum) granitic pegmatites that occur mainly in regions featuring abundant Palaeoproterozoic low to low medium-grade metamorphosed metasedimentary rocks and associated S-type granites. NYF-type (niobium-yttrium-fluorine) granitic pegmatites occur as individual dykes and fields throughout the Proterozoic bedrock of Sweden; notably the discovery location of tantalum was one of these granitic pegmatites. Research will focus on a few selected Swedish deposits and occurrences including Järkvissle, Räggen and Bergby in central Sweden, as well as Stripåsen and Utö as well as other rare-element pegmatites in the Bergslagen province, south central Sweden.



Coarse crystal aggregate of tantalite-(Mn) - columbite-(Fe) solid solution associated with coarse K-feldspar and spodumene, *in situ* underground in the Varuträsk LCT-type granitic pegmatite, northern Sweden. Photo: E. Jonsson, SGU.

To conclude...

Based on available information in the databases and archives of the partner surveys, a list of Nb-Ta occurrences and deposits is being produced. Ultimately, at the end of the project, a report on the distribution and systematics of Nb-Ta mineralisations in Europe will also be produced. Prospective regions and their character of mineralisation will be summarized together with the overall European potential, in order to develop recommendations for future exploration. Furthermore, a discussion of conditions of Nb-Ta production in central Africa will be made. The potential of intra-European production of Nb-Ta to decrease the present near-total dependence on imports will also be assessed. As another outcome, an Inspire-compatible pan-European dataset of Nb-Ta mineralisations will be provided to the GeoERA information platform.



FRAME
FORECASTING AND ASSESSING EUROPE'S
STRATEGIC RAW MATERIALS NEEDS



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