

TANTALUM

KEY MINERAL FOR GADGETS
AND ELECTRONIC EQUIPMENT



Tantalum in Ethiopia

Tantalum is a strategic metal being a key metal in one of the most used gadgets in modern society, the mobile phone. Tantalum is also used in other types of electronic equipments and is thus high in demand. The trade name for the most common tantalum-bearing mineral is coltan whereas the mineralogical name is columbite. Ethiopia presently supplies close to ten percent of the World production of tantalum and has a good potential for a considerable expansion of the percentage.



Ethiopia is located on the horn of africa bordering Sudan, Somalia, Kenya and Eritrea..

Introduction

The Kenticha tantalum-bearing pegmatites were first discovered during a 1:250,000 scale geological mapping programme carried out by Ethiopian geologists in close cooperation with Soviet geologists in 1980. A major mapping and evaluation programme financed by the Soviet Union was carried out in 1981 to 1985. The project aimed at determining the extent of the tantalum-bearing rocks and to establish whether they were of commercial interest.

The Kenticha pegmatite is situated in the Adole area within the Precambrian basement of southern Ethiopia, which is the southern part of the Arabian-Nubian Shield formed by accretion of ocean arc terranes. The Neoproterozoic rocks can be divided into two distinct lithologic units:

1. Granite-gneiss complex and
2. Ophiolitic fold and thrust belts.

The latter are composed of mafic and

ultramafic volcanic rocks and metasediments. After several phases of deformation and metamorphism the units were

intruded by a number of pegmatites among which the Kenticha pegmatite field stand out.

The Kenticha pegmatite field

Pegmatites are abundant throughout the southern part of neoproterozoic rocks, but are especially abundant in the Kenticha pegmatite field area where

Table

they occur in an area of about 2,500 km². The pegmatites are emplaced at or near a major NNE-SSW trending shear zone. The pegmatites range from barren feldspar-muscovite pegmatites to different types of rare-element pegmatites.

The Kenticha pegmatite is a large pegmatite exposed for 2 km in length and 400 to 700m in width. It was emplaced in package of steeply dipping serpentinites and talc-tremolite schists. The thickness of the pegmatite varies. In locations where both hanging and foot wall contacts are exposed, thickness ranges between 40 and 100m.

The Kenticha pegmatites display complex zoning with up to nine mineral paragenetic assemblages. Apart from columbite a number of lithium minerals, beryls and sulphides are found.

Tantalum deposit

The Kenticha tantalum deposit is mined by Ethiopian Mineral Development Share Company (EMDSC). The production is around 70 tonnes of Ta metal per year (120 tonnes of concentrate at 60 percent Ta₂O₅). The probable reserve of primary ore is 17,000 tonnes at Ta₂O₅ at a grade of 0.017 percent Ta₂O₅, whereas the reserve of Ta₂O₅ in the weathered zone was calculated to 2400 tonnes at 0.015 percent Ta₂O₅.

Additional commodities

The pegmatites in the Adola area display a variety of minerals of which the lithium bearing phases such as spodumene and Li-micas over time may be a valuable additional by-product.

Coltan is known to host a number of element such as rare earth elements (REE) of which neodymium (used for powerful magnets) europium used in TV screens are the best known. Uranium is also a frequent element hosted in

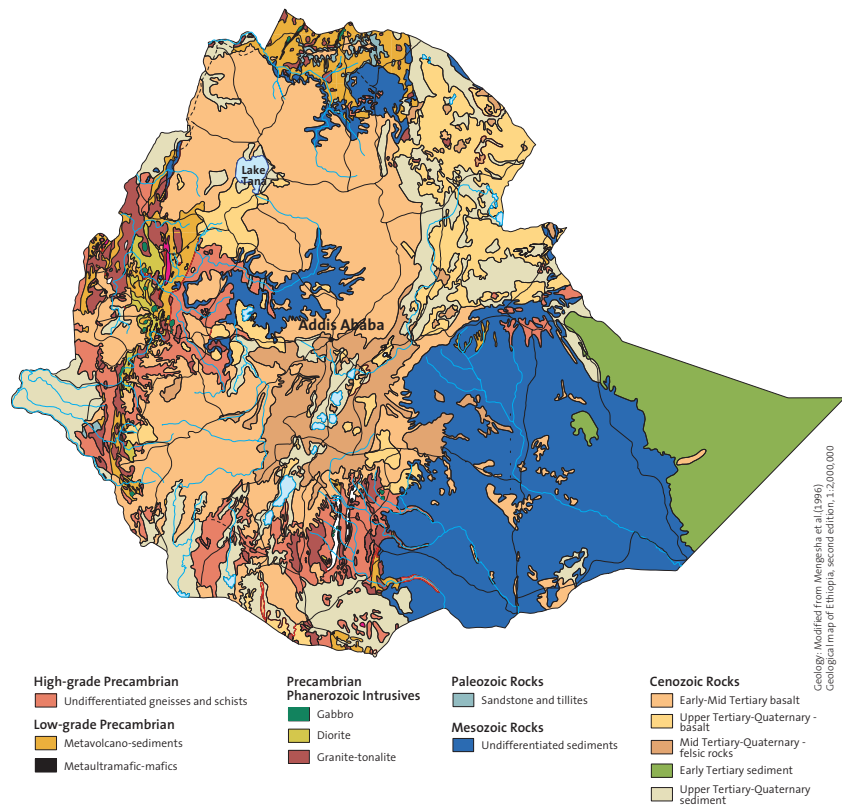


Fig. 1. Simplified geological map of Ethiopia with localities of building stone in the central and southern parts of the country.

coltan.

In the Kenticha pegmatite certain parts of the coltan mineralization does carry low levels of uranium. Uranium in coltan can be a problem or an asset depending on the level of uranium. In most parts of the Kenticha coltan the uranium is below the critical level of 0.5%. Certain markets e.g. Europe does



Kenticha mine



Outcrop of tantalum pegmatite

not allow import of coltan with uranium contents above 0.5% whereas other markets e.g. China allows higher uranium contents.

Presently the Ethiopian Mineral Development Share Company seeks partners to develop a plant to separate uranium from the tantalum.

Further potential

No systematic exploration has been carried out for further rare metal pegmatites. However, in the surrounding a large number of small showings of coltan have been found, many of which are mined by small-scale miners. These are only surface deposits.

However, information from the company mining the pegmatite indicate that the shear



Columbite crystals in pegmatite

zone hosting the Kenticha rare metal pegmatite can be followed for more that a hundred kilometres towards North containing a number of columbite showings.

Reports of columbite minerals in placer deposits further north towards the border to Somaliland, and the presence of several coltan mineralizations across the border near Hergiesa substantiate the assumption that there is a vast potential for finding further commercial tantalum deposits in Ethiopia.



Weathered out columbite crystals



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