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New Technology of Quartz and Feldspar Ore Dressing

In order to develop new technology of pegmatite ore processing a number of studies are to be conducted. They are:

- investigation of mineralogical composition of the original ore of various grades produced;
- estimation of key characteristics of minerals on the stages of crushing and grinding;
- studies on ore size kinetics reduction;
- technological research of ore dressability factor.

The main ore minerals are feldspars (microcline, plagioclase) and quartz, secondary mineral is biotite, its content is in the range of 0.5 - 1.0%. At the accessory level of 0.1% or less muscovite, pyrrhotite, chalcopyrite, tourmaline, garnet, amphibole, and pyroxene are present in the ore. The study of texture and structural properties of pegmatite ore showed that their mineralogical and technological features are the following:

1. Relatively simple ore texture and mineral composition, lack of mutual germination of quartz and feldspar. This, and the high mineral content in the ore, determines the use of relatively simple circuits and methods of ore processing in production of quartz-feldspar concentrate.

2. The presence of large crystals of minerals. Microcline is presented by large (up to 100 mm) crystals, large single crystals with graphic ingrowths of quartz isometric crystals ranging in size from 1 to 20 mm, forming a coarse-grained aggregates with quartz and plagioclase. Plagioclase forms large (50-70 mm) single crystals and isometric allocation (20-30 mm) in quartz, microcline and plagioclase aggregates. Quartz forms two types: graphic intergrowths of different sizes (from 0.12 to 50 mm on the long axis) in the feldspar and granular aggregates in association with feldspar (the size of isometric grains of quartz in this case is in the range of 1-20 mm). This feature promotes good disclosure of minerals during grinding fineness, close to the average size of the crystal grains of feldspar and quartz (>3 mm).

3. Presence of unaltered, fresh mineral surface, which is the basis for effective use of electromagnetic and electrical methods of ore separation in the process of enrichment. Mineralogical analysis of ore crushed to-10 mm size confirms the results of mineralogical and technological expertise showing that almost full disclosure of feldspar and quartz occurs in size of less than 3 mm. The amount of minerals in the free form increases in the transition from large to small classes.

The technology has been successfully implemented at Kuru-Vaara deposit.