

**ECONOMIC ASPECTS OF GRANITIC PEGMATITE
FROM THABEIKKYIN, MOGOK AND
MOMEIK TOWNSHIP**

PhD DISSERTATION

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ABSTRACT

The main purpose of this study is to investigate the petrological, mineralogical and genetic aspects of gem quality mineral-bearing pegmatitic rocks. The pegmatites from three different localities in northern Myanmar; (1) Pyingyitaung, Singu area, (2) Auk Namphate-Apaw Namphate- Sakangyi –Pantaw. Mogok area, and (3) Ketchel-Molo, Momeik area were studied.

This work include detailed field investigation in each pegmatite occurrence, petrographical identification, mineral identification by X.R.D technique and trace element analysis by X.R.F method. In addition, detailed investigation on gem quality minerals were also done by using refractometer and gemmolyte. Total of ten pegmatite occurrences, (six in Momeik and four in Mogok areas) were studied.

The mineralogical assemblages found in the pegmatite of the individual locality are quite different. The large minerals are found in all of the study area but giant quartz, orthoclase, aquamarine and topaz crystals are found in Mogok area only. In Mogok area, rare gemquality minerals of spessartine garnet, jeremejevite, herderite, tourmaline, scheelite and radioactive minerals such as thorianite, uranothorianite and thorutite are found. In Momeik area, local miners mainly produce mushroom tourmaline, prismatic tourmaline, petalite, hambergite, phenakite, pollucite and minor accessory minerals of yellow apatite and tantalite are found. According to the mineralogical and geochemical characteristics, pegmatites of the Singu area fall into the pegmatite family LCT in class **Rare Element** and **Lepidolite Subtype** in Rare-Earth pegmatite type. The metamorphic environment and the structural features of pegmatites such as interior pods/pockets of crosscutting or conformable nature, also with an agreement with LCT type in Rare Element Class of Cerny 1991 classification. Low-pressure, Abukuma amphibolite to upper greenschist facies Formed at pressure~2-4 kb and temperature~ 650-500°C. The Singu pegmatite has abundant lepidolite $(K(Li,Al)_3(Si,Al)_4O_{10}(F,OH)_2)$ and beryl $Be_3Al_2(SiO_3)_6$.

The pegmatites of Momeik area fall into the pegmatite family **LCT** in class **Rare Element** and **Petalite Subtype** in **Rare-Earth pegmatite type**. The metamorphic environment and the structural features of pegmatites such as interior pods/pockets of crosscutting or conformable nature, also with an agreement with LCT type in Rare Element Class of Cerny 1991 classification as Low-pressure, Abukuma

amphibolite to upper greenschist facies Formed at pressure~2-4 kb and temperature~ 650-500°C. The Momeik pegmatite contains petalite, tantalite, lepidolite, pollucite and beryl.

According to mineralogical and geochemical characteristics, pegmatite of Mogok area fall into both of the pegmatite family LCT and NYF in class Rare Element of and Beryl-columbite Subtype in Beryl Pegmatite type. The metamorphic environment and the structural features of pegmatites such as interior pods/pockets of crosscutting or conformable nature, also with an agreement with LCT type and NYF type in Rare Element Class of Cerny 1991 classification. The Mogok pegmatite bears beryl, columbite, tantalite, lepidolite and fluorite.

For local exploration at the mine site in the study area, iron oxides stained fractures are good exploration guide for the discovery of mineral-bearing pods. The gem quality mineral-bearing pockets have different physical properties as compared to those of the host pegmatite due to the presence of clayey material in the pockets. In tourmaline mines when looking for pockets there are some key indicators that will aid the search. In typical quartz and feldspar pegmatites one of the key indicators is float crystal shards with good euhedral crystal faces. These shards are helpful in locating the source and finding the hidden crystals by digging. Another indicator is large quartz outcrop with plants or vegetation growing out of it. Generally vugs and cavities filled with water allow plants to survive and thrive in their own little water supply especially if some earth has entered the cavity upon collapse in the past. Another method is using ground penetration radar (GPR). The application of GPR has been successful in delineating gem bearing zone in pegmatite veins, sills and dykes.

Underground mining methods such as square pit mining, open pit mining and aditing are employed in primary pegmatite mining and sluicing method is applied in secondary on highly weathered pegmatites.

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