GENESIS OF PEGMATITES AND USE OF PEGMATITE MINE WASTE AS FERTILIZER, MATALE DISTRICT, SRI LANKA

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Matale District in Sri Lanka is well-known for many mineral deposits, most of which contribute to the national economic development. Detailed geological, mineralogical and geochemical studies were carried out on several exposed mineral deposits located in the Matale District in order to understand the genesis of ore bodies and assess the economic potential of them.

Syenitic to granitic pegmatite bodies which carry several valuable minerals such as quartz, feldspar, mica, and topaz are common in the study area. The field setting, petrography of pegmatites and chemical composition of feldspars around Owala area suggest that those have been derived from a single hydro-saline magmatic source generated by crustal anatexis processes. Liquid fractionation of volatile-enriched, silica-undersaturated melt from the parent magma resulted to form syenitic pegmatites. The residual melt, rich in silica had fractionated again slightly and was emplaced as granitic pegmatites in the vicinity of syenitic pegmatites. However, the granitic pegmatites in the northern part of the area may have derived from a different magmatic source. The lower concentrations of trace elements of feldspars in all studied pegmatites imply that they have less potential for economic minerals other than presently available industrial minerals and topaz.

Mafic granulites boudinage bodies intercalated with marble host in the vicinity of pegmatitic bodies imply that crustal rocks have experienced granulite-facies metamorphism at conditions of 854 ± 33^{0}C at 10.8 ± 0.6 kbars as revealed by mineral assemblages of Grt-Opx-Cpx-Bt-Pl-Qtz. Although pressure-temperature estimates of present study are identical with the pressure-temperatures estimates using sapphirine-

bearing rocks elsewhere in the Highland Complex, those are considerably higher than the pressure-temperature estimates using other thermo-barometers.

Laboratory incubation experiments show that the waste products at mining sites can also be effectively used as mineral fertilizer. The results reveal that mixtures of waste feldspar and apatite can be utilized as a multi-nutrient fertilizer for long term crops growing in acidic soils. Release of K^+ from mica by reaction with organic acid is much greater than that from potassium feldspar. However, mica also releases higher quantities of iron that is toxic for plant and the iron released may form insoluble iron phosphates with available phosphate. As such, mica cannot be used as a fertilizer.