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Geochemistry and origin of alkaline granites at Wadi Umm Adawi-Yahmid area, South Sinai- Egypt

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Abstract

The alkaline granites of the study area are characterized by the predominance of alkali feldspars, quartz minor amounts of riebeckite, plagioclase and biotite. Accessories are represented by zircon, apatite, titanite, allanite, chevkinite with secondary chlorite. They have peralkaline to slightly metalumminous character and were emplaced during post orogenic stages. The chondrite-normalized REE patterns display enrichment of light REE against depletion of heavy REE with significant Eu anomaly indicating extreme feldspar fractionation. They belong to A-type granites and have mantle derived source characterized by high K_2O, extremely Low MgO and CaO contents, the pronounced Eu anomaly and depleted in Ba, Sr and Ta against enrichment of (HFSE) Zr, Y, Rb ,Nb and ΣREE. They have formed under low oxygen fugacity (*f*O2) conditions with high magmatic temperature up to 896ºC with fairly low water pressures. Intrusions of alkali feldspar granite followed by riebeckite granite (alkaline granite) are consistent with fractional crystallization model. This was supported by the presence of syenitic microgranular enclaves with felsic alkaline granite. The most plausible source of these alkaline granites is mantle derived potassium rich source, that may accompanied by further magma mixing or assimilations.

Keywords: The Alkaline granites, alkaline magmatism, A-type granites, Mantle source.