

## PETROLOGICAL AND GEOCHEMICAL STUDIES OF CARBONATITE AND ULTRAMAFIC ROCKS OF SUNG VALLEY, SHILLONG PLATEAU, NORTH-EASTERN INDIA: IMPLICATION FOR PETROGENESIS

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### Abstract

Carbonatites in association with Cretaceous ultramafic and alkaline rocks are exposed in Sung Valley, East Khasi Hills, Meghalaya. Carbonatites and ultramafic rocks have been petrographically and geochemically studied. Ultramafic rocks are mostly pyroxenites, while the carbonatites are apatite-carbonatites and silico-carbonatites. Pyroxenites are characterized by high SiO<sub>2</sub> (avg. 52 wt.%), high MgO (avg. 16 wt.%), low Nb (avg. 4 ppm), low Zr (avg. 45 ppm) compared to carbonatites. The carbonatites are characterized by low to moderate SiO<sub>2</sub> (39-44 wt.%), high CaO (13.3 to 24.3 wt.%), low MgO (2 to 10 wt.%), high Nb (19-39 ppm) and high Zr (342-822 ppm) contents. The concentration of total Rare Earth Element (©REE) in carbonatite ranges from (520 to 820 ppm). ©REE for pyroxenites averages 101 ppm. Primordial Mantle (PM) normalized multi-elemental patterns for the pyroxenites and carbonatites show flat patterns along with negative anomalies at Sr, Ti and Y. Both the rock types display an enriched pattern compared to PM though the carbonatites display a higher level of enrichment (10 – 90 times PM). Chondrite normalized REE patterns of carbonatite display a flat pattern [(La/Yb)<sub>N</sub> = 1.6 - 9.8] along with negative anomalies at Nd. Similar fractionated REE patterns are also displayed by pyroxenites [(La/Yb)<sub>N</sub> = avg. 4.5] but with a prominent negative Eu anomaly. Carbonatites display a higher level of REE enrichment in both the rock types (100 to 800 times chondrite). Geochemical characteristics therefore suggest that magmas for the pyroxenites as derived from a garnet bearing deeper mantle; while that for the carbonatites was derived from a carbonated peridotite.

*Keywords:* Carbonatite, Sung Valley, Shillong Plateau, Petrography and Geochemistry