

Chemical mapping of distribution of carbonate phase in Eppawala carbonatite

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Calcite rich rocks have greater economic potential for certain industries such as Precipitated Calcium Carbonate (PCC), lime and ceramic industries. As shown by previous investigations, carbonatite bodies exposed at Eppawala have high contents of calcite compared to crystalline limestone (marble) of the country. Therefore, the present study focused to investigate the spatial variation of carbonate minerals of carbonatite bodies covering an area about 20 000 m² in the southern quarry of Eppawala phosphate mining site.

Representative samples were collected, so that the chemical variation of carbonatite bodies can be identified along and across their length. Collected samples were visually selected to isolate the carbonate fractions and acid digested (HCl) powders were used for chemical analyses. Carbonate minerals of them were identified using X-Ray Diffraction analysis (XRD) and Alizarin Red Staining (ARS) method. Elemental concentrations of samples were determined on an Atomic Absorption Spectrometer (AAS).

Analytical results confirmed that the carbonate phase of carbonatites is composed mainly of calcite (70 %) with minor dolomite (~20 %). The content of Ca and Mg of them are variable, and the Ca content varies from about 17 to 30 wt %, where as Mg content varies from 3 to 14 wt %. The amounts of Fe, Mn, Cu and Zn of studied carbonate minerals of carbonatites are very low. As depicted from the chemical zonation maps, the Ca content increases toward the western and the north-western parts of the quarry, while the Mg, Cu, Fe and Mn contents are significantly high towards the south-eastern part of the quarry. Since the content of Fe in carbonate minerals is positively correlated with the Mg content, it can be used as an indicator ion in finding the dolomite rich areas. The observed chemically distinct zones are a result of the variations in the modal abundances of the calcite and dolomite in carbonatite exposures. The un-mixing in primary carbonatite magma or fractional crystallization may have resulted in the zonation of carbonatite bodies. Further, it can be suggested that western part of the quarry is much suitable for raw materials for the Ca based mineral industries.

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