

MINERALOGY AND GEOCHEMISTRY OF BALANGODA CALCITE DEPOSIT, RATHNAPURA DISTRICT, SRI LANKA: INSIGHTS INTO ECONOMIC POTENTIAL

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In recent years, significant attention has been paid to natural calcite resources as a viable CaCO₃ reservoir for various industrial applications. Despite extensive marble occurrences in the Highland Complex (HC) of Sri Lanka, their usage is limited to a few conventional industries owing to their chemical heterogeneity and dolomitic nature. However, the marbles exposed in Balangoda area of the Ratnapura District, Sri Lanka, consist of large-scale Calcite Deposits (CDs). In this study, we aimed to estimate the economic potential of these CDs-bearing marbles by studying their extent, mineralogy and chemical composition. More than 40 rock samples from the CDs and marble were investigated for their mineralogy and chemistry on a petrographic microscope, X-ray diffractometer (XRD), and wavelength dispersive X-ray fluorescence spectrometer (WD-XRF). The CDs-bearing marble band extends about 40 km, and minable quantities of CDs are well exposed in the areas of Illukpelessa, Rajawaka, Piyangiriya, Hapugasthenna, Kottimbulwala, Weligepola, Galpaya, Koswatiya, and Udawalawa. These CDs occur as intermittent bands and isolated pockets within the marble and consist of medium to very coarse (1 cm to 12 cm) grained calcite crystals. The majority of the calcite grains are inclusion-free, although a few contain trace amounts of graphite, apatite, and/or diopside inclusions. The CDs can easily be distinguished from marble and silicate impurities owing to their distinct textural characteristics. The associated marble is composed of dolomite (80 %) and calcite (15%) with lesser silicate impurities. Based on the elemental analyses, the CDs consist of CaO (54.64-55.07 wt.%) with a negligible amount of MgO (0.38-1.14 wt.%), SiO₂ (0.7-0.18 wt.%), and Fe₂O₃ (0.03-0.11 wt.%) and can be characterized as high-grade calcite ore. These results imply that the CDs are economically potential CaCO₃ sources, which could be utilized in the production of Ca-based chemical products such as Grounded Calcite Carbonate (GCC) and Precipitated Calcium Carbonate (PCC).

Keywords: *Calcite deposit, marble, geochemistry, mineralogy, economic potential*