

SRI LANKAN MARBLES: GEOCHEMICAL AND MINERALOGICAL INSIGHTS INTO ECONOMIC POTENTIAL

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The central region of Sri Lanka hosts extensive marble deposits with significant mineralogical and geochemical variations across different locations. Understanding these differences is essential for assessing the potential and practical applications of Sri Lankan marble on a large scale. This study investigates the economic potential of marbles from Naula, Matale, Digana, Ampitiya, and Balangoda, employing X-ray Diffractometry, Thermogravimetric Analysis, Atomic Absorption Spectrophotometry, and Wavelength Dispersive X-ray Fluorescence analyses. The study identifies three types of carbonate formations: (i) dolomitic marbles, (ii) calcite-rich marbles, and (iii) monomineralic calcite deposits. Dolomitic marbles are prevalent in the studied areas, whereas calcite-rich marbles and calcite deposits are concentrated in specific geological areas. Both dolomitic marble and calcite deposits are sufficiently abundant for economic mining. Dolomitic marbles have a CaO content of 30.5–34.24 wt% and MgO content of 13.3–21.82 wt%, making them suitable for industrial applications MgO extraction and precipitation of CaCO₃ (PCC) due to their high MgO and low impurity levels (SiO₂: 0.48–2.31 wt%; FeO: 0.003–0.5 wt%). Calcite-rich marbles, with CaO content ranging from 49.69–51.79 wt% and MgO content between 3.54–4.35 wt %, are not economically viable for large-scale production due to their limited thickness and restricted distribution. The calcite deposits in Balangoda primarily consist of coarse crystalline calcite, with 94.18–98.73 wt% CaCO₃, and ball-milled calcite yields over 90% of particles in the 1–10 µm range, with low levels of impurities (MgO: 0.31–1.96 wt%; FeO: 0.05–0.25 wt%; SO₂: 0.3–1.15 wt%). This makes it ideal for use as Ground Calcium Carbonate (GCC) in paper, rubber, and paint industries. These findings highlight the substantial economic potential of Sri Lankan dolomitic marble and calcite deposits, offering promising opportunities to reduce dependency on GCC, PCC, and MgO imports.

Keywords: *Calcite deposits, Dolomitic marble, Grounded Calcium Carbonate (GCC), Sri Lankan marbles.*