Geochemical Characterization of Magnetite Ore Deposit in Buttala, Sri Lanka

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Sri Lanka comprises of a fairly large number of valuable mineral deposits. However, most of these deposits have not yet been scientifically investigated, in terms of their origin, grade, mineralogy, quality and the quantity. Iron ore deposits of Sri Lanka are divided into three categories as magnetite deposits, hydrated iron oxide deposits and copper-magnetite type deposits. The largest magnetite deposit of the country is located at Palawatte, Buttala in Uva province. The origin, quality and the quantity of the Buttala magnetite deposit (BMD) is still debatable. Therefore, present study focused to interpret the geochemical characteristics in order to predict the possible sources for the origin of BMD. Rock samples were collected from the pre-determined locations in BMD area. Representative magnetite bearing rock samples and country rock samples were collected mainly from fresh outcrops available at the surface. A detailed geochemical analysis was conducted by X-ray fluorescence (XRF) spectroscopy. The results of major oxides indicated high content of iron (>80%) with minor amounts of SiO_2 (7.02%), Al_2O_3 (5.98%), TiO_2 (3.22%), MgO (2.82%), K_2O (0.22%), CaO (0.12%) and MnO (0.08%). The spatial distribution plots of trace elements and major elements indicate the mineralization is localized to the hummock of the study area. The depleted concentrations of elements such as Ti and Zr that are considered relatively immobile in hydrothermal fluids suggests the involvement of hydrothermal processes to the formation of BMD. Further, it is recommended a detailed petrographic analysis in order to confirm the hydrothermal origin of the BMD.

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