

**GEOCHEMISTRY, MINERALOGY AND ECONOMIC POTENTIAL OF
TITANO-HEMATITE ROCK OF THE SAMCHAMPI CARBONATITE-
ALKALINE ROCK COMPLEX, KARBI-ANGLONG DISTRICT, ASSAM,
INDIA**

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Abstract

Two, large stock-like bodies of titano-hematite rock (THR) occur prominently (c.2.5 sq.km. in outcrop area) in the dominantly soil covered carbonatite-alkaline ring complex of Samchampi that was emplaced in close proximity to the Kalyani lineament during the Upper Cretaceous (c. 109 Ma ago) in the Mikir Hills massif of Assam. Petrographic studies indicate that hematite is the predominant ore mineral with minor amounts of ilmenite and accessory phases of perovskite, pyrochlore and crandallite. Ore textures exhibit well developed exsolution lamellae of ilmenite along the octahedral cleavages of original magnetite that has been completely martitised. The average major and minor oxides (in wt.%) and trace elements (in ppm) composition of the THR (14 samples) are as follows: SiO₂ 1.10, TiO₂ 3.44, Al₂O₃ 3.91, Fe₂O₃ 81.27, FeO 0.58, MnO 0.25, MgO 0.39, CaO 0.49, Na₂O 0.04, K₂O 0.01, LOI 6.23, V 1787, Sr 2002, Ba 263, Zr 794, Nb 2201, Y 142 and total REE 3672 (12 samples). EPMA studies have revealed the distinct presence of mineral phases such as pyrochlore, crandallite, ilmenite and perovskite that account for the chemical constituents other than hematite in the ore. Based on geological and geophysical (ground magnetic) studies, a reserve of 75 million tons of THR has been inferred up to a depth of 30 m in the Ganjang (I&II) and Thulbung ore blocks. Thus the THR of the Samchampi complex could become a potential source for major iron with Ti, Nb and REE as co-products in the region besides phosphatic rocks (c. 15 million tons up to a 10 m depth with a average grade of 35% P₂O₅) along the curvilinear fault zones of the complex.

Key Words: Titano-hematite rock, Samchampi Carbonatite-Alkaline rock complex, Assam.