

NEW INSIGHTS INTO CHEMISTRY OF HIGH MgO ULTRAMAFIC CUMULATES (KOMATIITES) AND ASSOCIATED PLATINUM GROUP ELEMENTS IN PARTS OF CHOTANAGPUR GNEISSIC TERRAIN, EASTERN INDIA.

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Abstract

Occurrence of high MgO containing ultramafic cumulates (Komatiites) are recorded near Semra village within metaultramafites and dolomitic marbles in close spatial association with amphibolites of tholeiitic composition in the NW fringe of Chotanagpur Gneissic Terrain (CGT). The two megascopically distinguishable varieties of komatiites are observed. The commonly occurring one is a cumulate and the other occasionally recorded one is a spinifex textured komatiite. These rocks contain olivine (at places altered to serpentine), pyroxenes, chromite, magnetite, spinel as their mineral component. Ore petrography study reveals the presence of pyrrhotite, pentlandite, chalcopyrite, pyrite, galena and sphalerite as sulphides and chromite, magnetite and chromespinel as oxides phases. The sulphide minerals host appreciable concentration of Platinum Group Elements (PGE). Major, trace and rare earth geochemistry suggest their Al depleted nature similar to the Barberton type komatiites. High Ti together with variable Al_2O_3/TiO_2 and $(Gd/Yb)_n > 1$ suggest garnet fractionation during partial melting and formation along the margin of a rising plume. Chemistry and concentration of PGE in the rock suggest a fertile magma and hence detail exploration for precious elements is suggested.

Keywords: Chotanagpur Gneissic Terrain, Semra village, Ultramafic cumulates, Barberton type komatiites, Sulphide phases, Platinum Group of Elements, Fertile magma.