

GEOCHEMICAL CHARACTERIZATION OF CHAKRADHARPUR GRANITE AND ITS ROLE IN URANIUM MINERALIZATION IN METASEDIMENT OF WESTERN SECTOR OF SINGHBHUM SHEAR ZONE

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Abstract

The Chakradharpur Granite-gneiss (CKPG) is grey coloured, medium grained and composed mainly of quartz, feldspar, biotite, muscovite and accessory sphene, epidote and zircon. The granitoids have two textural variants: one is plagioclase rich and the other one is K-feldspar rich. Post-emplacement deformation is noted in the form of deformed lamellae of plagioclase feldspar, minor folding/kinking in muscovite flakes, strained quartz grains.

It has variable composition ranging from tonalite to granite with K_2O/Na_2O ratio slightly higher than 1.0 which is also reflected in the CaO-Na₂O-K₂O and Ab-An-Or diagrams. Major oxides, trace elements and REE data show that CKPG are granitoids with a calc-alkaline affinity and exhibit predominantly a per-aluminous nature. The K_2O/Na_2O ratio ranges from 0.02-2.78 indicating that there is progressive increase in K-feldspar. Chemical Index of Alteration (CIA) shows that CKP granite has undergone weak to moderate chemical weathering varying from 50.14%- 66.55%. U and Th in CKP Granite ranges from 1 to 8 ppm and 10-47 ppm, respectively with Th/U ratio varying between 2.28-2.42. Based on petrological and geochemical characters CKPG is not considered to be a source rock for uranium in metasediments occurring in the western part of Singhbhum Shear Zone (SSZ).

Keywords: Chakradharpur granite-gneiss, Chemical Index of alteration (CIA), Singhbhum Shear Zone (SSZ).