Journal of Applied Geochemistry
Vo. 19, No. 3 (2017). pp. 242-246

RADIOELEMENTAL ABUNDANCE IN CO-GENETIC GRANITE AND PEGMATITES OF KAWADGAON AREA, BASTAR CRATON, CHHATTISGARH: PETROGENETIC IMPLICATIONS

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Abstract

The Archaean gneisses and metasedimentary rocks of the Sukma/Bengpal Group form the oldest lithounits in the investigated area around Kawadgaon-Challanpara. These are intruded by Paleoproterozoic granites and related pegmatites. The granites exposed over a fairly large tract in the Kawadgaon area, are medium- to coarse-grained, and have yielded an Rb-Sr, whole-rock isochrone age of 2497 Ma, with an initial $^{87}Sr/^{86}Sr$ ratio of 0.7142. Aureoles in them display textural and mineralogical gradation from granite to pegmatite.

The concentrations of radioelements in the granites are 0.73 to 5.39% (av. 3.73) K, 3 to 24 ppm (av. 9.6) U, and 6 to 82 ppm (av. 36.1) Th. On the other hand, the concentration of these elements in co-genetic pegmatites are 0.09 to 8.33% (av. 4.6) K, 1.6 to 23 ppm (av. 7.37) U, and 2.7 to 81 ppm (av. 27.06) Th. Data reveal that when compared with granites, the concentration of potassium (av. 4.6%K) in co-genetic pegmatites is more, whereas, there is a drop in U and Th content in co-genetic pegmatites, although occasionally isolated high values have been observed in pegmatites.

Anomalously high abundance of radioelements in the investigated felsic bodies are interpreted to be due to their formation from differentiated melts. In fact, K, U, and Th being Large Ion Lithophile Elements (LILE) cannot be accommodated in the structure of the early-formed Ferro-magnesian minerals and, hence get largely enriched in the late felsic differentiates. Data, also suggest that these studied co-genetic felsic bodies belong to the category of 'evolved' granite-pegmatite suite. The observed irregularly high concentrations of the radioelements are possibly also due to varying degrees of (Partial melting) geochemical evolution and differentiation of these felsic bodies.

Keywords: Radioelements, Petrogenesis, Granite, Pegmatites, Bastar Craton, Archean gneisses, Metasediments.