

Petrochemical study of Chakdara granitic gneisses in prospect of gold and precious metals, Lower Dir, KP , Pakistan

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Abstract

The Chakdara granitic gneisses are the Carboniferous-Permian intrusive body located in the northern most portion of the Indian plate, south of the Main Mantle Thrust (MMT). These rocks are related to the Pan-African rift, which episodically intruded by younger hydrothermal phases. Major element and CIPW normative data together with the field observations are used to examine the petrochemical characteristics of the Chakdara granitic gneisses and their possible potential of Au, Ag and base metal mineralization within these younger phases. The geochemical data obtained for the Chakdara granitic gneisses indicate high concentration of silica (73.24–76.42 %) and alkalies (7.98 – 9.74 %) and low concentration of iron (1.02 – 1.67 %) and magnesium (0.14–0.41 %), however CIPW normative values of the analysed samples revealed more than 90% normative content of quartz and feldspar. Geochemically these rocks are sub-alkaline, granitic to alkali granitic in composition. Analysis revealed that these rocks have high K calc-alkaline affinity, whereas high alumina to silica ratio in these rocks infers them to be metaluminous to peraluminous. Quartzofeldspathic veins and sulfide mineralization zones within the Chakdara granite gneisses have economically low concentration of Au, Ag and base metals. The anomalous values of Au, Ag and base metals within the quartzofeldspathic veins and sulfide mineralization zones suggest detailed investigation of the study region. Integrated approach, using combination of geophysical tools and deep drilled samples, is recommended to investigate the area for probable economically workable precious metal mineralization