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Genesis of gold mineralization in Kundarkocha gold deposit, Singhbhum Craton, eastern India: evidences from host rock geochemistry

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Gold mineralization in Kundarkocha area of the Singhbhum Craton in eastern India is hosted by the meta-volcano-sedimentary sequence of the Archean Iron Ore Group. The disseminated and vein type gold occurrences in Kundarkocha deposit are intimately associated with the graphitic schist, carbonaceous phyllite and talc–chlorite–serpentine schist assemblages. The total budget of gold from the gold mine comes from the nugget gold distributed within the litho-types as well as the fine gold inclusions associated with sulfide minerals like pyrite, pyrrhotite, arsenopyrite and chalcopyrite as established from the petrographic studies [1]. In order to understand the possible source of the gold in this deposit, host rock geochemistry has been used for deciphering the evolution of gold mineralization. The geochemical attributes of the host meta-ultramafic rocks with high MgO, Ni, Cr, V, low silica, low TiO₂ and relatively LREE enrichment compared to MREE suggest it to be of basaltic komatiites to Archean boninitic composition. Further, evidences of compressive regimes related to subduction processes have been detected in the area of study. Regarding, the source of gold, metabasaltic rocks have been considered to be one of the major source rocks for orogenic gold deposits [2]. Apart from this, evidences of Archean gold mineralization derived directly or indirectly from komatiites through the action of metamorphic fluid evolution have been recorded [3]. Detailed geological evidences and geochemical characteristics of the host rocks from Kundarkocha gold deposit envisages the basaltic komatiites to Archean boninites as the possible source for gold.

[1] Sahoo, PR and Venkatesh, AS (2015) Journal of Asian Earth Sciences 97:136-149.

[2] Pitcairn IK et al., (2015) Mineralium Deposita 50(3): 373-390.

[3] Keays RR (1995) Lithos 34:1-18.

