

Investigating the Pathfinding Elements and Indicator Minerals of Au as the Main Geological Signatures for Au Ore Discovery at Kubi Gold Deposit, Ghana

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Abstract : X-ray diffraction (XRD), X-ray photoelectron spectroscopy (XPS), scanning electron microscopy (SEM), and energy dispersive X-ray spectroscopy (EDX) are applied to investigate the properties of rock samples from a drill hole from the Kubi Gold Project of the Asante Gold Corporation near Dunwka-on-Offin in the Central Region of Ghana. The distribution of these minerals in the rocks were observed in the drill hole sections. X-ray diffraction indicates that the samples contain garnet, pyrite, periclase, and quartz as the main indicator minerals. SEM revealed morphologies of these minerals. From EDX and XPS, Fe, Mg, Al, S, O, Hg, Ti, Mn, Na, Ag, Au, Cu, Si, and K are identified as the pathfinder elements in the area that either form alloys with gold or inherent elements in the sediments. This finding can be ascribed to primary geochemical distribution, which developed from crystallization of magma and hydrothermal liquids as well as the movement of metasomatic elements and the precipitous rate of chemical weathering of lateralization in secondary processes. The results indicate that Au mineralization in the Kubi Mine area is controlled by garnet, pyrite, goethite, and kaolinite that grades up to the surface (oxides) with hematite and limonite alterations.

Keywords : gold, minerals, pathfinder element, spectroscopy, X-ray

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