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Selective leaching Analysis of Cu porphyry deposit, Plutus Prospect, Botswana.

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Botswana a flat terrain, rich in mineral resources notably diamonds is mostly covered by Kalahari sand. Apart from diamonds, there are significant deposits of copper, nickel, zinc [1]. The Plutus prospect is part of the early Paleozoic Pan-African Ghanzi belt, which has potential copper deposit because the regional correlation and possible similarities to working mines in Namibia and the Zambian Copper belt. The prospect area has poor outcrop/ no fresh bedrock exposed and 90% of the area is covered by Aeolian Kalahari sediments with a layer of sand up to 20m thick underlain by a 5m thick calcrete layer [2]. The thick regolith cover masking the mineralisation is a challenge for mineral exploration.

Despite new advances in exploration technology, geochemistry remains the direct and effective method used during the reconnaissance stage in mineral exploration. A study to evaluate the suitability of two selective leaching techniques, hydroxylamine hydrochloride and ammonium acetate, to detect and locate copper mineralisation through element signatures of the overlying regolith at Plutus mine was conducted. The geochemical methods are based on partial extraction by targeting a specific phase in the sample and releasing elements that have co-precipitated with or adsorbed to this phase are considered in this study [3].

Result showed similar trends/ patterns for both leaches in the study area with different concentration. Since the surface samples consisted mainly of Aeolian sand, data from hydroxylamine hydrochloride was used for the delineation of the mineralised zone using elements associated with copper mineralisation namely cobalt and nickel. Nonetheless, the ammonium acetate leach results produced higher concentration values of copper, nickel, cobalt and detected more elements that were not detect from the hydroxylamine hydrochloride leach. Thus the study concluded that ammonium acetate leach is the most effective technique used.

References:

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