

STRUCTURAL CONTROLS AND GEOCHEMISTRY OF URANIUM MINERALISATION IN PAN-AFRICAN TERRAIN: CASE STUDY OF THE GHUMCHI URANIUM MINERALISATION, N.E. NIGERIA.

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ABSTRACT

The Ghumchi uranium mineralisation is a hydrothermal vein-type deposit hosted by a small brittle-ductile granitic shear zone. The mineralisation is concordant to the mylonitic foliation and is confined to N – S and N140E – N155E fault trends. Results of this study show that mylonites at zones of intersection of these two trends as well as areas where these trends are truncated by lamprophyric dykes show elevated ore concentration. The brittle structures in the breccias and cataclasites zones on the other hand, are barren. Under the microscope the mineralised mylonites are typified by asymmetric porphyroclasts and cleavage controlled bookshelf sliding microstructures in feldspars. Dissolution textures, veined structures and pervasive plagioclase alteration are restricted to samples collected at the zones of fracture convergence.

Comparative geochemical analysis of the wall rock versus the ore host mylonites indicate that solution transfer processes were operational in the ore concentration stage. The mineralised samples, for example, are depleted in the alkalis Na_2O and K_2O but show elevated TiO_2 , Fe_2O_3 , Pb, V, Mo, As as opposed to the fresh granite and altered but barren samples. These results are useful for structural predictions in future uranium exploration efforts within the Pan-African belt of Nigeria (which spans over several thousands km^2) and beyond.