

Mineral Paragenesis and Alteration Evolution of the Futa Gold Prospect, Ghana: Implications for Splay Mineralisation Along the Chirano Gold Corridor

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The Futa Gold Prospect represents a newly identified mineralised zone within the Paleoproterozoic Sefwi-Bibiani gold belt of southwestern Ghana, situated along strike from the producing Chirano Gold Mine. Although the principal orebodies of the Chirano Main Lode are well characterised in the literature, the internal architecture and along-strike continuity of subsidiary splay structures remain poorly constrained, limiting confidence in projecting mineralised shoots beyond the defined resource envelope.

This study integrates systematic field mapping, oriented drill core logging, transmitted and reflected light petrography, and sulphide textural analysis to establish the mineral paragenesis and hydrothermal alteration evolution of the Futa system.

Gold mineralisation is hosted predominantly within tonalite, with subordinate occurrences in diorite and dolerite. Four temporally distinct and texturally defined stages are recognised: (1) magmatic crystallisation of a plagioclase–amphibole ± quartz assemblage; (2) early hydrothermal quartz–albite alteration; (3) syn-deformational sericite–chlorite–epidote ± carbonate alteration; and (4) late-stage quartz–albite–carbonate–sulphide veining, with which economic gold grades are principally associated. Northeast–southwest-trending structural corridors (mean orientation: 035°/60° NW), localise mineralised vein networks and their associated alteration halos, demonstrating a strong structural control on syn-mineralisation fluid flow.

Direct comparison of alteration assemblages, sulphide paragenetic textures, and structural geometry at Futa with published datasets from the Chirano Main Lode reveals close correspondence across all three criteria. These observations are interpreted to reflect derivation from a shared hydrothermal fluid system and support the characterisation of Futa as a splay of the principal mineralised corridor.

This work provides a petrological and structural framework for evaluating the resource potential of analogous splay structures within the broader Sefwi-Bibiani belt and is consistent with orogenic gold systems of the West African Craton.