The Fishtie Cu-Co Deposit, NE Zambia: Stratigraphy, Structural Architecture, Hydrothermal Alteration, and Mineralization

Subaru Tsuruoka, Danny Hnatyshin, Murray Hitzman, Koen Torremans
Irish Centre for Research in Applied Geosciences (iCRAG), University College Dublin, Dublin, Ireland

The ores of the Central African Copper Belt (CACB) are hosted in the Neoproterozoic Katangan Supergroup which consists of rift-related sediments (Lower Roan Subgroup), platformal sediments (Upper Roan Subgroup), and shallow marine sediments (Mwasha Subgroup, Nguba Group, and Kundelungu Group). The Fishtie deposit is an important example of Cu-Co mineralization and is located in the south-easternmost portion of the Zambian Copperbelt in the Lusale basin. The Fishtie deposit is characterized by Cu and Co sulfide mineralization hosted in the Nguba Group. Here we provide a full geologic description of the deposit that can be used to help evaluate the nature and evolution of hydrothermal systems at Fishtie and the greater CACB.

The lowermost Nguba Group rocks consist of a <300m-thick succession which directly overlies basement rocks or rocks of the Upper Roan Subgroup; rocks of the Lower Roan Subgroup are absent. The Nguba Group consists of diamictite and siltstones of the Grand Conglomérat which are overlain by carbonaceous siltstones of the Kaponda Formation and the dolomites and carbonaceous siltstones of Kakontwe Formation. The Grand Conglomérat is comprised of five individual debrite units whose thicknesses were controlled by basement topography and synsedimentary normal faults.

An assemblage of bornite-chalcopyrite occurs above positive basement topographic relief and adjacent to synsedimentary normal faults. This sulfide assemblage transitions outboard to chalcopyrite-pyrite and pyrite-sphalerite assemblages. Cobalt mineralization occurs in the eastern portion of the deposit where cobaltite is disseminated in carbonaceous siltstone and also occurs in dolomite-quartz veins. Alteration is consistent throughout the deposit with early biotite and quartz replaced and overgrown by chlorite, dolomite and sulfides. A mean model Re-Os age of 492+/-3 Ma (n=3) from vein-hosted cobaltite indicates that cobalt mineralization followed the main stage of the Lufilian Orogeny.