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### Application of the crystals habits cavities forms of Cu-Co sulfides in green field exploration along the Lufilian arc: An example of Tenke Fungurume Mining District (Democratic Republic of Congo)

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The Tenke Fungurume Mining District (TFMD), one of the Cu-Co giant deposits along the Lufilian arc, is located in the southeastern part of the Democratic Republic of Congo (DRC), about 185 Km NW of the major city of Lubumbashi. Cu-Co mineralization in this area is mainly occurring in the Roan Group along the Lufilian arc. The exploration of deposits in the past was facilitated by the outcropping supergene ores and large associated vegetation clearing. The multiphase mineralizing event is the newly developed metallogenic model, trying to explain the origin of these deposits type [1]. In this study, we focused on the petrography and mineralogy features of the quartz veins and the "Roche Siliceuse Cellulaire" (RSC) unity in order to update the green field exploration methodology.

The Cu-Co sulfides such as chalcopyrite, bornite, chalcocite and carrollite were precipitated during the diagenetic stage and remobilized under low grade metamorphism related to the Neoproterozoic Lufilian orogeny. In the meteoritic weathering zone, the Cellular dolomite rock was altered by silicification and transforming into the Siliceous cellular rock named "Roche Siliceuse Cellulaire" (RSC) [2]. Also the sulfide ores were transformed into Cu-Co silicates, carbonates and oxides minerals mainly as chrysocolla, malachite and heterogenite. The resulting textures of host rocks and quartz veins allow distinguishing several crystals habits cavities forms left by these sulfides during the weathering. These are rectangular and parallelogram faced cavities of chalcocite, octahedral, cubic and tetrahedral form cavities of bornite, carrollite and pyrite and dodecahedral faced cavities of bornite. Hematite or iron oxide precipitated in these cavities within or without supergene ore minerals.

The green field exploration methodology proposed here is based on the identification of the crystals habits cavities left by the sulfides and described above as evidence of the existence hypogene minerals in the Mine Subgroup deposits. They have been protected by the high silicification. Other crystals habits such as framboidal, globular and radial are confusing with the dissolution cavities. These results applied during the exploration at TFMD, can be extended to the Lufilian arc as a whole.

#### Reference

[1] Haest, M., Muchez, Ph., 2011. *Geologica Belgica* 14, 23-44.

[2] Mambwe, M.P., Chabu, M., Lubala, R.T., Kipata, M.L., 2013. 24<sup>rd</sup> Colloquium of African Geology, Addis Abeba (Ethiopia), Vol. Abstract, p156.

