

The Study of the Different Types of Mineralization in Relation to the Correlation of Copper, Arsenic in the Gold Ore of the Yaléa Deposit in West Mali

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ABSTRACT

The study of the Yaléa deposit, which is located in western Mali, shows that the ore body is located between two major structures, the Senegalo-Malian shear and the Yaléa shear. This allows us to say that at Yaléa, the mineralization has an essentially structural control. The problem is that the Yaléa deposit is the richest gold deposit but with a lower recovery rate than the other Loulo deposits. In this article our first study is based on the analysis of the grade of several rock samples taken at the mine. The high grade at Yaléa would be caused by the intersection between the NNE-SSW structure and the Yaléa NS shear. This state of affairs has thus created an expansion zone where the gold has concentrated following phases of reactivation of the Yaléa shear. Each phase is characterized by particular alterations; a first phase dominated by silica-albite alteration; a second phase dominated by silica-albite-carbonate alteration; and a third phase, the most important, dominated by chlorite alteration. According to the phases of the mineralization of Yaléa, 3 distinct types can be distinguished according to their textures and their paragenesis. The first type is located in the Breccia of very fine clasts and an essentially chloritized matrix. The sulphides are fine and intimately bound to the matrix of the host rock. The second type which differs from type 1 by its low sulphide content and the presence of coarse sulphides. Type 2 may also be brecciated but of clasts larger than those of type 1 and albitized. It is characterized by the presence of silica-carbonate veins and veinlets (stockwork) and located in the peripheries of type 1. The third type which is located in the peripheries of type 2, where chlorite alteration is located in fractures decreases considerably. In this article our second study is based on multi-element mineralurgical tests (Au, Cu, As). It is carried out over 45 blocks. This allowed us to understand that there is a correlation between these elements. This correlation has been observed from the analysis of the block models (the block model for copper, the block model for Arsenic and the block model for Gold). These models have shown that in the Yaléa deposit, the zones of high gold content correspond to the zones of high copper and arsenic content. This allows us to understand that Copper and Arsenic are gold tracers in the Yaléa deposit. The interpretation of the results of the mineralurgical tests carried out on the blocks showed that the recovery of gold from Yaléa ore is inversely proportional to the content of copper and arsenic in the different types of ore.

Keywords: Yaléa; Mineralization; Mineralurgical test; modeled block; Correlation

