

## **ABSTRACT**

The Trapiche Ni-Co prospect (11.755532°S, 76.000321°W, between 4200 and 4800 masl), is located 1 km SE of the Andaychagua Mine, Yauli Province, in the western Andean Cordillera of Peru, about 110 km east of Lima. The area is part of the Yauli dome, a NNW-SSE elongated anticlinorium core consisting of Paleozoic rocks that outcrops between Mesozoic and younger rocks. These rocks are late Miocene intrusions to which porphyry Cu-Mo and porphyry-related epithermal polymetallic "Cordilleran" mineralization is genetically linked, including, from South to North, the deposits of Andaychagua, San Cristobal, Toromocho, and Morococho.

At Trapiche, discontinuous Ni-Co-Zn-Pb-Cu bodies parallel to bedding ("mantos") are hosted by bioclastic limestones and basaltic rocks extensively altered to Mn-Fe-Ca-Mg bearing carbonates + quartz and sericite. The protolith belongs to the Devonian Excelsior Group that is dominated by organic-rich shales and that has been affected by strong deformation and weak metamorphism of Hercynian age. The Excelsior Group volcanic rocks in the area show signatures of MORB within plate tholeiite basalts to within plate alkaline basalts.

The mineralization in Trapiche consists of fine-grained sulfides, sulfoarsenides and sulfosalts. Main Ni-Co ore minerals recognized on the deposit are millerite, siegenite-violaite, gersdorffite, cobaltite, and ullmanite. Other ore minerals, common to all deposits on the district, are Fe-poor sphalerite, galena, pyrite, tetrahedrite and chalcocopyrite.

Carbonates are the main gangue mineral on Trapiche, where two generations have been found. The first one has high values of Mn > Fe and minor Ca and Mg and the second one shows Mn-Ca-Mg-Fe composition less rich in Mn and Fe. Abundant quartz and minor muscovite (sericite) occur also in the hydrothermal mineral association.

The magmatic sulfur isotope signature of Ni-Co sulfides ( $\delta^{34}\text{S}$  values close to 0) in Trapiche is similar to that of sulfides in Zn-Pb-Ag veins from the Yauli district. Ore mineral sulfur is of magmatic origin and no indication of bacteriogenic source is recognized (as it could be expected if sulfur was leached from framboidal pyrite in the Excelsior shales).

Veins of hydrothermal Mn-Fe rich carbonates including Ni-Co minerals crosscut the metamorphic quartz veins indicating that the ore is post-metamorphic. Despite its Ni-Co rich mineral association, Trapiche shares main characteristics with Miocene Cordilleran polymetallic deposits in the area. Available results suggest that the Trapiche mineralization is a Ni-Co rich variety of Stage C style Cordilleran polymetallic mineralization.

**Keywords:** *Miocene polymetallic belt, porphyry-related epithermal mineralization*