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Unveiling Geometallurgical Potential: Insights from the Soledad Cu-Au-Ag Mineralized Tourmaline Breccias, Central Peru

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In Peru's Cordillera Negra, within the prolific Miocene metallogenic belt, the Soledad Project was acquired by Chakana in 2017 to advance the exploration of multiple mineralized tourmaline breccias in the area. An initial inferred resource was released in 2022, encompassing seven breccia pipes from surface to an average depth of 330 meters. These pipes yielded 6.7 Mt grading 0.88 g/t Au, 0.88% Cu, and 54.2 g/t Ag combined in both open pit and underground resources. Geometallurgical studies on three breccia pipes to optimize mineral processing and waste management strategies are in progress.

We have developed a geometallurgical workflow involving several key steps:

- Domain Definition: Utilizing geochemical analysis, including machine learning algorithms, to correlate with visible geological features such as breccia type, alteration type, and mineralogy
- Sample Selection: Focus to ensure representativity
- Sample Composite Preparation
- Analysis: Bulk mineralogy assessment was characterized through various techniques such as whole-rock geochemistry, petrography, scanning electron microscopy, electron microprobe, X-ray diffraction, and Automated Mineral Identification and Characterization System (AMICS) imaging. Gold characterization included visible gold grain separation and heavy mineral concentrates analysis using multiple size fractions, as well as LA-ICPMS transects on core slabs and individual mineral LA-ICPMS maps

Results from Breccia 05 defined four geometallurgical domains, from which eight samples were selected. The main sulfides are chalcopyrite-pyrite, and the main gangue minerals are tourmaline and quartz with over 30% each, then carbonates and white micas with less than 5% each. Most of the copper, ~92.8%, is carried by the chalcopyrite; ~45.7% of the silver is hosted by tetrahedrite. Gold deportment studies are in progress, but visible gold grains have been observed, ranging from 25 to 125 microns in length. Liberation sizes, particle locking, and mineral associations have been determined for each domain in the three pipes.