The High Sulfidation Epithermal Copper Deposits at Monywa, Central West Myanmar

Yi Sun,[1] Jing Chen,[2] Xiaokang Li,[1] and Win Myint[1]

[1] Myanmar Yang Tse Copper Limited, Salingy Township, Sagain Region, Myanmar
[2] ARC Centre of Excellence in Ore Deposits (CODES), School of Physical Sciences, University of Tasmania, Private Bag 79, Hobart, Tasmania, Australia 7001

*E-mail, pkusunyi@gmail.com

The Monywa copper district is located in the central-west of Myanmar, approximately 600 km NNW of Yongon. Over 2 billion tonnes (bt) of ore contain 7 Mt of Cu. There are four high-sulfidation epithermal deposits in Monywa copper district: the Sabetaung, Sabetaung-South, Kyisintaung, and Letpadaung.

The main host rock is late Miocene andesite porphyry. A supergene-enriched blanket and minor hypogene silica-chalcocite veins are hosted in an early Miocene sandstone and middle Miocene andesitic pyroclastic package. A late Miocene biotite andesite porphyry intrusion (postmineralization dikes) cut the orebodies. Three main NNE-trending and steeply SE dipping normal faults subdivide the Kyisintaung, Sabetaung, and Sabetaung-South. A series of subparallel NNE-trending and steeply SE dipping faults are coincident with the hypogene ore. Most of the hypogene orebodies are controlled by NE-trending, steeply dipping faults in each block.

Two types of hydrothermal breccias occur within the Monywa district. Jigsaw to mosaic monomict breccia with andesite porphyry clasts, cemented by chalcocite, pyrite, and silica, occur as subvertical veins with the orientation mentioned above. Barite-enargite occurs in the vugs of cement. The chaotic polymict matrix-rich breccia contains andesite porphyry, pyroclastic, sandstone and massive pyrite clasts. The matrix-rich breccia also has minor pyrite-chalcocite-silica cement and a large amount of rock flour matrix. The matrix-rich breccia has the same occurrence as cement-rich breccia. A barren matrix-rich polymict diatreme breccia pipe is in the southeastern part of Sabetaung with 100 m in diameter. Supergene mineralization has enriched the Sabetaung-South fault zone.

There is over 500 m in vertical silica-alunite alteration at Letpadaung and Kyisintaung, related to high-grade mineralization, but alunite only occurs as small veinlets/breccias at Sabetaung. Minor silica-dickite-alunite alteration is observed near the east benches of Kyisintaung. The bottom of Kyisintaung is dominated by the silica-pyrophyllite alteration. Silica-illite assemblages are rare at the Kyisintaung and Lepadaung, but are abundant in deeper parts of Sabetaung, and are related to low-grade mineralization.

The most abundant ore minerals in the hypogene zone are chalcocite, enargite, covellite, and minor digenite. The high-grade ore occurs in the widespread hydrothermal breccias and the surrounding sheeted veins with silica halos at Kyisintaung and Lepadaung. Veins containing octahedral or massive pyrite and coating fine grain chalcocite are common in the deeper parts of Sabetaung, but are of low-grade mineralization. In Kyisintaung, some vuggy quartz is filled with pyrite, chalcocite, and dickite.

There is a 100- to 200-m-thick leached cap at Kyisintaung and Letpadaung. At Sabetaung, the leached cap is thinner. Hematite, kaolinite, and supergene alunite characterize leach cap mineralogy. Sabetaung and Sabetaung South Pit have thick supergene enrichment zones with average thickness of 60 m and contain a high-grade (over 20 Cu wt %) pipe with 40 m in wide and over 100 m high.

Monywa is one of the world's largest high sulfidation Cu deposits in terms of contained metal. The hypogene ores are open at depth. The transition to pyrophyllite and minor dickite at the bottom of the open pit suggests the intrusions below are the source of mineralization.