

INTRODUCTION TO SULFIDE MINERAL PARAGENESIS OF HUGO DUMMETT DEPOSIT, OF OYU TOLGOI PORPHYRY CU-AU SYSTEM, SOUTH MONGOLIA

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Oyu Tolgoi is newly found huge Cu-Au porphyry system, which is located in the south Gobi region, Mongolia, approximately 550 km south of Ulaanbaatar and 80 km north of the Chinese-Mongolian border.

On regional geologic tectonic setting the Oyu Tolgoi area locates within the Paleozoic Gurvansaikhan island arc terrane, which hosts 6 major Cu-Au and Cu-Mo porphyry deposits and more than 45 occurrences. The Oyu Tolgoi Cu-Au porphyry system consists of north east trending 6 km long mineralized zone with five deposits: South Oyu Tolgoi; South west Oyu Tolgoi, Central Oyu Tolgoi, Hugo Dummett North and Hugo Dummett South. Present reserve of Oyu Tolgoi area is 1.15 billion tones, grading 1.27% copper and 0.48 g/t gold (Ivanhoe Mines Mongolia Inc; news release, January 30, 2006.).

The Hugo Dummett deposit is located at the northern most part of Oyu Tolgoi system, consisting of a deep seated 2 km long ore-body, which is folded together with host rocks.

The Hugo Dummett deposit is hosted by an easterly-dipping sequence of volcanic strata correlated with the lower part of the Devonian Alagbayan Formation, and quartz monzodiorite intrusive rocks. Stratigraphically lowest rocks in the sequence consist of porphyritic basalt lawas and minor volcanoclastic strata. These rocks are overlain by approximately 100-200 m thick dacite tuffs and breccias.

High grade copper mineralization in the Hugo deposit is related to a zone of intense stockwork and sheeted quartz veins, which is centred on thin, east-dipping quartz monzodiorite intrusions or within the upper part of the large quartz monzodiorite body.

Main sulfide minerals are bornite, chalcopyrite, chalcocite, pyrite, enargite, tennantite, tetrahedrite, molybdenite, covellite, digenite, sphalerite and Ag, Se, Te bearing sulfosalts. On a large scale there is a general zonation outward and upward from bornite-chalcopyrite to chalcopyrite, followed by pyrite-enargite. High-grade bornite or bornite-chalcopyrite mineralization is associated with muscovite alteration, and in some areas with late dark green chlorite.

The high-grade bornite zone comprises relatively coarse bornite impregnating quartz and disseminated in wall rocks, usually intergrown with subordinate chalcopyrite. Pyrite is rare or absent, except in local areas where the host rocks are advanced argillically altered. In addition, high-grade bornite is associated with minor amounts of tennantite, sphalerite, hessite, clausthalite, and gold. These minerals occur as inclusions or at grain boundaries.

The geologic setting of Oyu Tolgoi area, and mineralization, alteration paragenesis of Hugo Dammutt deposit was introduced. Furthermore, sulfide mineral paragenesis in combination quartz vein texture with characterization of ore fluid using EPMA analyses and SEM-CL analyses including some fluid inclusion are planned.