

Initial study on the mineral assemblages associated with Cu-Au mineralization, DMLZ deposit, Grasberg mine, Papua, Indonesia

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Grasberg mine is one of the biggest Cu-Au mine in the world. The Deep Mill Level Zone (DMLZ), a skarn mineralization, is one of the operating mine in the Grasberg mineral districts. The DMLZ underground deposit started in 2015, and is expected to produce approximately 80,000 t/d in 2021. It is important to conduct scientific research of DMLZ deposit which is the newest and most prospective mining area in the Grasberg mine. Therefore, this study is focused on the DMLZ deposit, and the objective is to understand the zonation of mineral assemblages. Mineralization in this district is associated with Pliocene diorite, emplaced into Cretaceous sandstone and limestone that underlie the Tertiary limestone. The drill hole (TE17-09) which cuts the DMLZ deposit horizontally, is about 630m length and run through from Ertsberg diorite to limestone, and marble. Samples were collected at equal intervals (20m) of core TE17-09. In this study, mineral assemblages in exoskarn (about 320m to 480m part of the drill hole) is focused. Based on the microscopic observation, garnet is a main mineral of prograde stage, and chalcopyrite, pyrite and epidote are the main minerals of retrograde stage in the exoskarn. In addition, minerals formed in retrograde stage are specially developed. Native gold is associated with chalcopyrite. Gold mineralization in the exoskarn of DMLZ deposit mainly developed in the retrograde stage. Garnet can be observed in samples which are relatively proximal with intrusion. In contrast, calcite in host rock can be observed in samples which are relatively distal with intrusion. The border between garnet and calcite is about 360m part of this drill hole. For these things, it is guessed that hydrothermal fluids were cooled to the temperature in which minerals formed in prograde stage cannot be developed by about 360m part.

Keywords: skarn, zonation of mineral assemblages, Cu-Au mineralization