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地質学セミナー

Geological and mineralogical outline of the Chandmani Uul Fe-Cu-Au deposit in southeastern Mongolia

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The Chandmani Uul deposit locates at an elevation of about 1150 m in the eastern part of the Gobi, southeast Mongolia. The deposit is 400 km southeast of Ulaanbaatar and about 117 km northeast of Sainshand, the nearest large supple center, located along the Ulaanbaatar to Beijing railway line. Ore reserves of the deposit are estimated as 25 Mt of Fe, 100,000 ton of Cu and 3 ton of Au. Tectonically, the Chandmani Uul deposit locates in the south plane of Idermeg Terrane and north border of Ikh Bogd-Undurshil Fault zone (major lineament of Mongolia) (Badarch, 2002).

The geology of the Chandmani Uul deposit consists of Neoproterzoic metamorphic-sedimentary rocks, Neoproterzoic to lower Cambrian volcaniclastic sedimentary rocks and middle to late Ordovician metamorphic sedimentary rocks, lower Cretaceous sedimentary rocks. These sedimentary sequences were intruded by middle to upper Cambrian granitoids.

Chandmani Uul deposit consists of 3 major ore bodies, Chandmani I (Fe-Cu-Au), Chandmani II (Cu-Au-Mo) and Chandmani III (Cu-Zn-Pb) ore bodies. The ore body of Chandmani I has lenticular form that extends 100-250 m in length and 10-30 m in wideth. We sampled rock and ore specimens from drilling cores of Chandmani I. Based on the field investigation, petrography results, intrusive rocks are mainly altered schistosed diorite, biotite granodiorite.

Previous research suggests that this deposit is skarn-type in origin, however no skarn mineral is included in our samples except small amount of garnet in massive pyrite ore. Similarity of tectonic setting and mineral assemblage of the Chandmani I deposit with those of world IOCG (Iron Oxide Copper Gold) deposits suggests that the origin of this deposit is IOCG type.

Ores from the deposit are grouped into 3 types as follows. However, spatial and temporal relationship among these ore types is not clear in this stage.

Magnetite-hematite ore: This ore is most abundant in the Chandmani I deposit. Massive mushketovite (prismatic aggregate of magnetite with small amount of hematite at the rim of magnetite crystals) is the major mineral. Calcite-quartz veinlets usually cut magnetite-hematite ore.

Magnetite-chalcopyrite ore: This ore is also abundant in the deposit, and appears relatively lower level of the mine. Under ore microscope, chalcopyrite with small amount of pyrite is filled by aggregate of small magnetite grains. Hematite accompanies along grain boundary of magnetite.

Massive pyrite ore: This ore is not common in the deposit and appears in places. Aggregate of fine grained pyrite-calcite-garnet shows massive texture. Under ore microscope small amount of chalcopyrite and magnetite inclusion is commonly observed in pyrite.