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The Geochemical Characteristics and Prospecting Target of the Manley–Mandah Copper-molybdenum Deposit in Omnogovi Province of Mongolia

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The deposit is located in Omnogovi Province and north of Dornogovi Province, Mongolia. And the deposit passes through north-east area of Omnogovi Province and north area of Dornogovi Province in north-east direction.And it is on the western part of the Mongolia Omnogovi to Eastern Ukraine flag of China polymetal belt, which belongs to Manley–Mandah Cu-Mo metallogenic belt of southern Mongolia metallogenic.Extreme range of geographical coordinates:east longitude 106°00'~ 109° 00', north latitude 43°30'~ 44°40', an area of about 5,000 km^2.

1 Local Geology

The outcrop of the strata includes Devonian、Carboniferous、Permian、Cretaceous and Quaternary.

The deposit is located on the southern edge of the Mongolia center giant fault, north -west side of East Mongolia fault,and in Southern Mongolia Tectonomagmatic belt, as same as in the Paleozoic island arc belt which is in the middle of the east-west fault and north-east fault of south edge of the Siberia plate.

There are many east-west trend intrusions in the area, and the intrusions are also seen in the north and west-south area. Granite, Granite porphyry, granodiorite are the main magmatite.

Based on the contact relationship between pluton and wall rock, rock initially identified as the Late Carboniferous (Hercynian). And the mineralization of zinc, copper, gold, molybdenum are relatively to the calc-alkaline two diorite and granodiorite in Hercynian.

2 Geochemical Characteristics of Rocks

Through collecting 6 samples in main rock and dike rocks of the study area, a major element chemical analysis is tested.Compared with the average of Chinese granodiorite,the chemical composition of the rocks in this area is higher in Fe_2O_3、MgO、K_2O, fairly in SiO_2, lower in TiO_2、Al_2O_3、CaO、Na_2O. Granodiorite in study area is acidic - acid rock, which belongs to the calc-alkaline series.

Based on the research of Content、combination and variation of trace elements in granodiorite of the study area,it was found that the content of the high field strength elements, such as Nb、U、 Th、Y in granodiorite and the low-field such as Sr、Rb are higher in general than diorite porphyry and felsitic. While the content of Co、Sb of the former is generally lower than the latter, and the remaining elements in roughly the same.

Rare earth elements is an important geochemical indicator.And there is important significance in the study of the origin、evolution and mineralization of granodiorite in this region.The features of rare earth elements between granodiorite in this area and high potassiumandesitesin orogenic andesites are similar. Potassium andesite similar.Andesite outcrops widely in this area, so it is possible that granodiorite and andesite is homologous.

3 Discussion

Copper molybdenum mineralization body on surface in the study area is mostly produced in the granodiorite porphyry、granite of intrusive rocks. In addition,nearly east-west fault zone located in the southern region controls the distribution of the main intrusive rocks and mineralization in this area. Therefore, the main ore-controlling factors in the study area are the rock and structure,while the selectivity to stratum is unimportant.

The period of magmatite in this area is Late Carboniferous,which belongs to Hercynian. Based on the field observation, copper molybdenum mineralization is

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mainly distributed by veinlet and disseminated in granodiorite porphyry rock strain. It can be considered that the granodiorite porphyry and copper molybdenum mineralization have a genetic link,and they are products of the same tectonic magmatic evolution.

Based on the research on petrochemistry、trace elements、rare earth elements of the magmatic rock in this area, the granodiorite belongs to the adakitic rocks. Experts believe that the most porphyry copper (gold, molybdenum) deposits with adakitic rocks related. Therefore, the adakitic rocks in this area are important marks for searching porphyry copper gold molybdenum ore.

Through discussing the ore-controlling factors、the spatial and temporal distribution of the deposit、the source ofmetallogenic material, it leads to the conclusion that the prospecting direction of this area is searching for the Hercynian porphyry Cu-Mo deposit.

4 Conclusion

(1) Through the study on strata、structure、magmatic rock and its relationship with the mineralization，it was summarized that the mining geological characteristics of Manley–Mandah Copper molybdenum metallogenic belt.

(2)Based on the research on petrological geochemistry including major elements、trace elements and rare earth elements of the magmatic rock in this area, the results showed that the granodiorite rocks of this area with adakitic characteristics.

(3) Through discussing the ore-controlling factors、the spatial and temporal distribution of the deposit、the source of metallogenic material, it leads to the conclusion that the prospecting direction of this area is searching for the Hercynian porphyry Cu-Mo deposit.

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