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Metallogenic Time of the Bilugangan Molybdenum Deposit and the Indosinian Mineralization in Abaga Banner, Inner Mongolia

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1 Geologic characteristic

Located in the southern of Erlian-Hegen mountain belt, Bilugangan is a newly discovered Mo deposit of large scale in the center section of Inner Mongolia. Molybdenum mineralization occurs within the Indosinian granite stock or along its contact zone with Permian strata, consisting of veins, veinlets. The exposed stratigraphic unit is the upper Permian part of the Linxi group which mainly composed of dacite, sandstone, crystallinoclastic tuff et al. Magmatic activity occurred in the center district with northeast direction (Fig. 1). The Indosinian magmatic units include granite, granite-porphphyry. The texture of the ore-bearing granite is porphyritic-like. The typical major constituents of granite are present that phenocryst: feldspar, quartz (~25vol.%), parent: plagioclase (~20vol.%), feldspar (~20vol.%), quartz (~30vol.%), biotite (~5vol.%). There are 3 rich molybdenum ore section in the mining area, the molybdenum mineralization occurs in the granite and hornstone.

2 Major and Trace Elements of the Indosinian Granite

Bilugangan intrusive rocks are high potassic calc-alkaline series, with high SiO_2 (73.35 ~76.89), rich in alkali and aluminum, $\text{K}_2\text{O}/\text{Na}_2\text{O}$ between 1.06 ~1.11, $\text{Mg\#}$ (50.10 ~86.71) (Fig. 2). The REE elements of the intrusive rocks exhibit a low amount of total rare earth elements (REE) and weak negative Eu anomaly (Fig. 3.a), with obvious differentiation between light rare earth elements and heavy rare earth elements, the ratio of LREE/HREE is 6.38 ~12.38, the ratio of La_N/Yb_N is 6.82 ~18.11. (Fig. 3.b).

3 Re-Os Isotopic Age

Re-Os dating of 5 molybdenite samples collected from

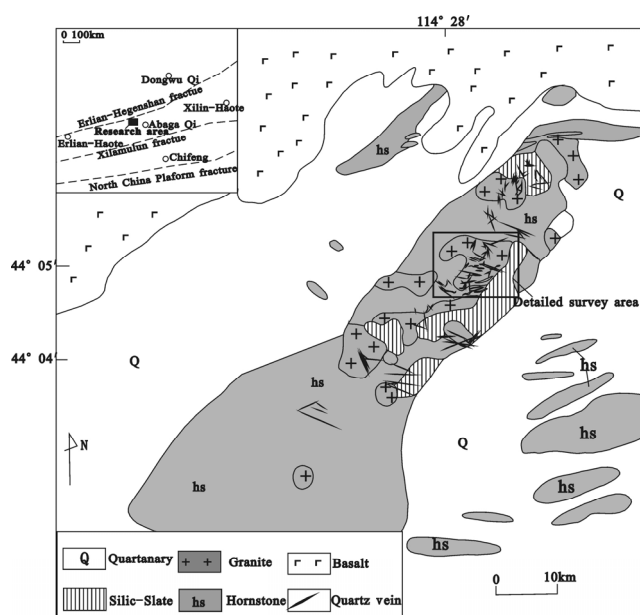


Fig. 1. The geologic map of the Bilugangan molybdenum deposit.

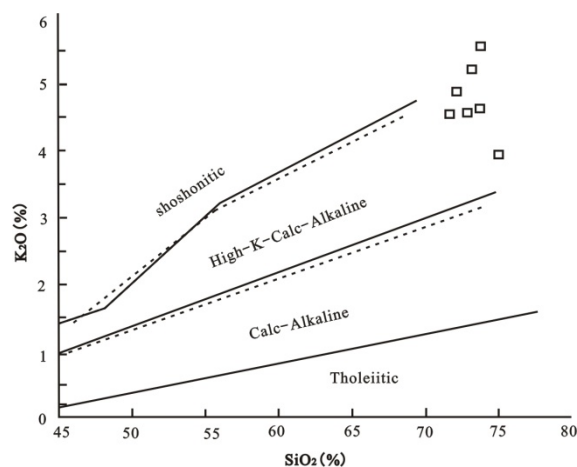


Fig. 2. Chemical classification diagrams for the Tugurige granite. SiO_2 -versus- K_2O diagram (after Peccerillo and Taylor, 1976).

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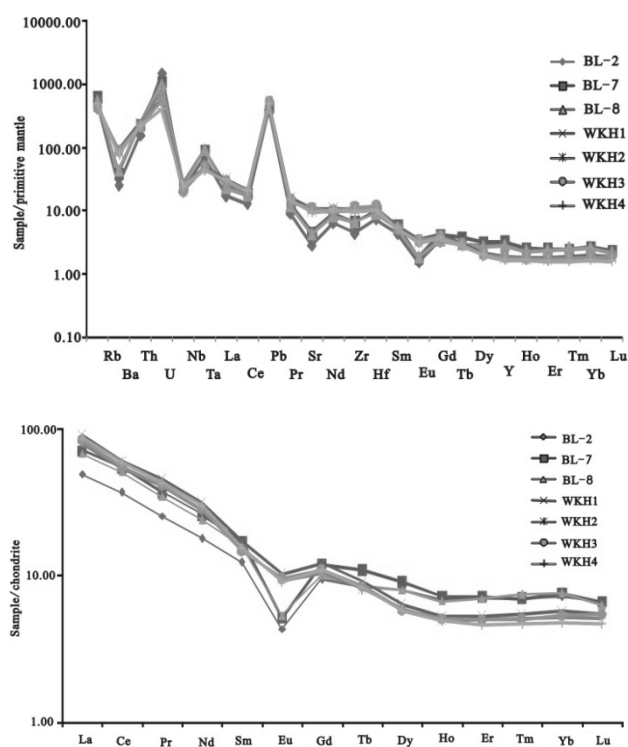


Fig. 3. Primitive mantle-normalized spidergrams for samples a and chondrite-normalized rare earth element patterns of Bilugangan samples b. Normalized values are from Sun and McDonough (1989).

the main ore body shows that the model age is (238 ~239.4) Ma and the isochron ages is 237.6Ma $\pm$ 4.6Ma (MSWD=0.116), the mineralization age is later than its host granite (Fig.4). The Re contents of molybdenite are indicating that $w(\text{Re}) : 58.6 \times 10^{-6} \sim 140.6 \times 10^{-6}$, $w(^{187}\text{Re}) : 36.81 \times 10^{-6} \sim 88.39 \times 10^{-6}$, $w(^{187}\text{Os}) : 158.0 \times 10^{-9} \sim 351.2 \times 10^{-9}$, they were mainly derived from crust – mantle mixed, the Mo deposit was driven by the syn-collisional setting.

4 Discussion and Conclusions

Thus Bilugangan molybdenum deposit is formed at the early Indosinian period and related to the tectonic - magmatic activities. In consideration of other isotopic age data from the molybdenum deposits in adjacent areas, it can be inferred that magmatism- mineralization of the molybdenum deposit exist more stage in the Erlan Haote- Xilin Haote area, the metallogenic time centralized in the Indosinian and Yanshan period. The Re contents of molybdenite are indicating that they were mainly derived from crust – mantle mixed, the Mo deposit was driven by the syn-collisional setting.

Acknowledgment

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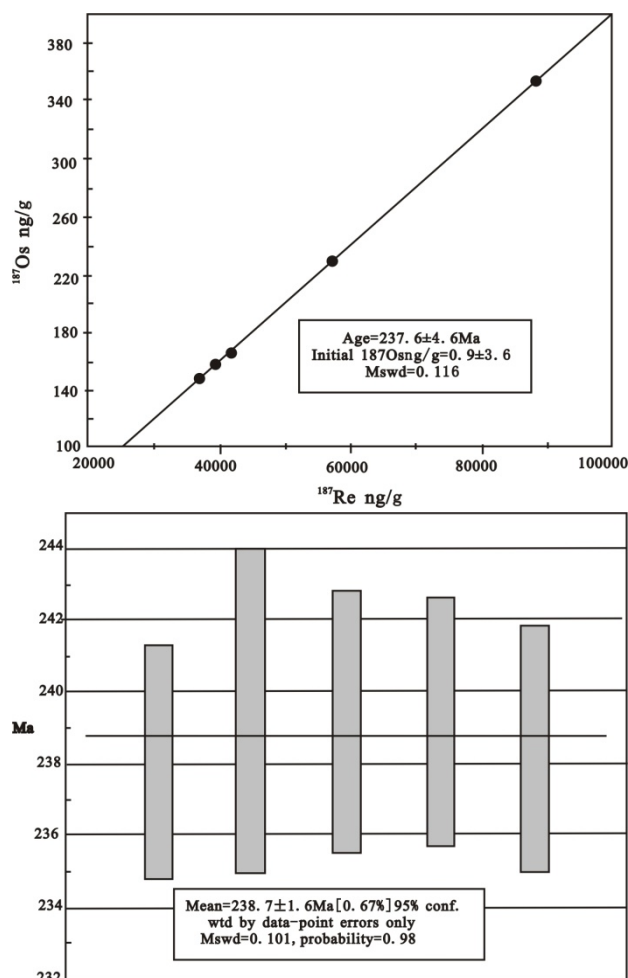


Fig. 4. Re-Os isotopic isochron age (a) and weighted average age (b) of molybdenite from the Bilugangan Mo deposit

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