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内蒙古道伦达坝铜钨多金属矿黑云母花岗岩年代学、地球化学特征及其地质意义

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摘要：

内蒙古道伦达坝铜钨多金属矿是大兴安岭南段近年来新发现的一个铜、钨、锡共生的多金属矿床，成矿与中粗粒黑云母花岗岩密切相关，但其形成时代还存在较大争议，对岩浆来源缺乏足够的研究。本文对道伦达坝矿床内黑云母花岗岩进行了系统的岩石地球化学、年代学、Hf-Pb同位素地球化学组成测试。道伦达坝黑云母花岗岩SiO_2含量为65.42%~67.41%，富铝、钾，A/NCK值为1.08~1.27，CIPW标准矿物刚玉含量较高（1.82%~4.08%），岩石属于过铝质S型花岗岩。微量、稀土元素组成表现出的轻稀土富集、重稀土亏损型式和Eu负异常以及明显的Nb、Ta、Sr、Ti亏损的特点显示为壳源成因的火山弧花岗岩。LA-ICP-MS锆石U-Pb测年结果表明其形成年龄为292.1±0.84Ma （MSWD=1.18） ~ 292.5±0.88Ma （MSWD=0.46）。Hf同位素测试结果显示，道伦达坝黑云母花岗岩的$\varepsilon_{Hf}(t)$=-0.8~+13.3，$^{176}Hf/^{177}Hf$比值（0.282643~0.282804）偏低，二阶段Hf同位素模式年龄较高（740~1024Ma）。全岩Pb同位素组成较均一，$^{206}Pb/^{204}Pb$介于18.416~18.766，$^{207}Pb/^{204}Pb$介于15.519~15.542，$^{208}Pb/^{204}Pb$变化在38.238~39.460。黑云母花岗岩为早二叠世西伯利亚板块南缘俯冲增生背景下的产物，主要源自从亏损地幔新增生的年轻地壳物质的部分重熔，在侵位过程中可能受到了残留的古地壳或岩石圈地幔的混染。古生代是兴蒙造山带的一个重要的成矿阶段，矿化以岛弧或活动大陆边缘背景下的斑岩-矽卡岩-热液脉型铜钼金多金属矿床为主。

英文摘要：

The Daolundaba Cu-W polymetallic deposit in Inner Mongolia is a newly found Cu-W-Sn intergrowth deposit in the southern Great Hinggan Range, the mineralization is closely related to the coarse-grained biotite granite. However, there is a hot argument over the formation age and a notable gap in the study on magma sources of the biotite granite. In this study, we conducted systematic rock geochemistry, geochronology, Hf-Pb isotopic composition analysis on the biotite granites in Daolundaba deposit. Biotite granite in Daolundaba deposit were characteristic with SiO_2 of 65.42%~67.41%, Al, K enriched, A/NCK values of 1.08~1.27, CIPW standard mineral corundum content is higher (1.82%~4.08%), which belonged to peraluminous S-type granite. Trace, rare earth elements composition of the samples showed LREE enriched, HREE depleted pattern and negative Eu anomalies as well as obvious Nb, Ta, Sr, Ti depleted, which displayed as crustal origin volcanic arc granites. Zircon U-Pb dating results showed that the formation age of the biotite granites ranged from 292.1±0.84Ma (MSWD=1.18) to 292.5±0.88Ma (MSWD=0.46). Hf isotope composition testing results suggested that the $\varepsilon_{Hf}(t)$ values of the biotite granites fall mainly into the range of -0.8~+13.3, with relatively low $^{176}Hf/^{177}Hf$ values (0.282643~0.282804) and older two-stage model ages (740~1024Ma). Whole-rock Pb isotopic compositions are uniform, the values of $^{206}Pb/^{204}Pb$, $^{207}Pb/^{204}Pb$ and $^{208}Pb/^{204}Pb$ were 18.416~18.766, 15.519~15.542 and 38.238~39.460, respectively. Biotite granites were the product under the setting of the Early Permian subduction-accretion of the southern margin of Siberian plate, which magma source was mainly derived from the partial remelting of the newly derived young crust from the depleted mantle, and may be occurred contamination by residual ancient crust or mantle during the emplacement process. Paleozoic is an important metallogenic stage of the Xingmeng Orogenic Belt, and the mineralization major of the porphyry-skarn-hydrothermal vein Cu-Mo-Au polymetallic deposit under the island arc or active continental margin setting.

关键词：锆石 U-Pb Hf-Pb同位素 早二叠世 道伦达坝Cu-W多金属矿 兴蒙造山带

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