Zircon U-Pb and whole rock geochemistry of the Chifeng molybdenum deposit and host granitoids, Inner Mongolia, NE China

YONGQIANG YANG[1,2], JUNFENG SHEN[2], YUFEN ZHANG[2]

[1]State Key Laboratory of Geological and Mineral Resources, China University of Geosciences, Beijing 100083, China
[2]School of Earth Sciences and Resources, China University of Geosciences, Beijing 100083, China

The Aolunhua Mo deposit is a typical porphyry deposit, which is located in the middle southern section of the Da Hinggan Range metallogenic belt and Chifeng District. We report here LA-ICP-MS zircon U-Pb age data from the granite porphyry that hosts the mineral deposit, together with the element geochemistry of the zircons and discuss the source material of the ore-forming rock of the deposit. The zircon data constrain the crystallization age of the granite porphyry as 135.0±1.0 Ma, correlating it with the widespread Yanshanian intermediate–felsic magmatic activity. The Th/U ratios of the zircon is greater than 0.1 with a significant positive Ce anomaly (Ce* =1.72–188.71) and negative Eu anomaly (Eu*=0.05–0.57). The zircons show depleted LREE and enriched HREE patterns and low La and Pr contents, suggesting crystallization from crustally-derived magmas. Based on the geology of the ore deposit and the age data, in combination with the regional geodynamic evolution, we infer that the Aolunhua Mo deposit was formed near the peak stage of Sn poly-metallic metallogenesis in the Da Hinggan Range region at around 140 Ma, associated with a tectonic setting characterized by the transition from compression to extension. Based on a comparison with the newly found Mo-deposits along the banks of the Xilamulun River, we propose that the Tianshan—Linxi is an important Mo-metallogenic belt. Our proposal has important implications for the targeting and exploration of blind ore deposits of this kind.

The Conclusion is the age of Mo-deposit of Inner Mongolia indicates that the granite porphyry is the product of early Cretaceous magmatic activity. The Aolunhua ore-deposit is formed within the Cu-Mo metallogenic belt at the northern flank of the Xilamulun River deep fracture which constitutes the Linxi-Tianshan Cu-Mo ore deposit belt and was formed during the peak stage of metallogeny at 140 Ma, caused by the magmatic activity developed during the transitional stage between compression-orogeny and back-arc extension.