Molybdenite Re-Os and scheelite Sm-Nd ages of the Kukaazi skarn Deposit in Western Kunlun, NW China

C.B. Leng[1], Y. H. Wang[1,2], X. C. Zhang[1], J.F. Gao[1], W. Zhang[1], X.Y. Xu[3]

[1] State Key Laboratory of Ore Deposit Geochemistry, Institute of Geochemistry, Chinese Academy of Sciences, Guiyang 550081, China
[2] Guizhou Central Laboratory of Geology and Mineral Resources, Guiyang 550018, China
[3] Tianjin Institute of Geology and Mineral Resources, Tianjin 300170, China

The newly-discovered Kukaazi skarn Cu-W-(Pb-Zn) deposit is located in the Western Kunlun orogenic belt, northwest China. The ore bodies occur mainly as lenses and stratabound sheets along beddings of the Mesoproterozoic metamorphic rocks. Three ore blocks (i.e. KI, KII and KIII) have been outlined in the Kukaazi deposit. The KI ore block is composed mainly of chalcopyrite, scheelite, pyrrhotite, sphalerite, galena and minor pyrite, arsenopyrite and molybdenite, whereas the other two are dominated by galena, sphalerite, magnetite and minor arsenopyrite and pyrite. In this study, we obtained a molybdenite isochron Re-Os age of 450.5 ± 6.4 Ma (2σ, MSWD=0.057) and a scheelite Sm-Nd isochron age of 426 ± 59 Ma (2σ, MSWD=0.49) for the ores from the KI ore block. These ages are comparable to those of granitoids in the region.

Scheelite grains from the KI ore block contain relatively high REE and Y contents (∑REE+Y = 42.0-95.7 ppm), and have LREE-enriched chondrite-normalized patterns and negative Eu anomalies (δEu=0.13–0.55) similar to the synchronous granitoids in the region. In addtion, the scheelite also has Sr and Nd isotopic compositions similar to the such granitoids, implying that the W-bearing fluid of the Kukaazi deposit was probably derived from the granitic magmas. Our results, for the first time, propose that the Ordovician granitoids are responsible for economic Mo-W-(Cu) mineralization in the Western Kunlun orogenic belt and these favorable districts could be prospecting exploration targets.