

Metallogenesis of stratiform Cu mineralization in the Dabaoshan deposit, Northern Guangdong Province, South China

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Abstract

The Dabaoshan Cu–Mo–W–Pb–Zn polymetallic deposit in northern Guangdong Province, South China, lies in the southern part of the Qin–Hang porphyry–skarn Cu–Mo ore belt and hosts both porphyry Mo and stratabound skarn Cu ores. The genesis of the Cu ore has been ascribed to typical skarn ore formed by the metasomatism of Devonian carbonate rock layers, or to a sediment-rock-hosted massive sulfide deposit formed by marine exhalation. In this paper, we report the ages of porphyry Mo and stratiform Cu ores determined with molybdenite Re–Os and sericite Ar–Ar methods, respectively. Nine samples from the granodiorite porphyry Mo ores yielded Re–Os model ages ranging from 165.7 ± 2.3 to 163.4 ± 2.4 Ma, with a weighted mean age of 164.8 ± 0.8 Ma (MSWD = 0.52). Sericite from two samples of stratiform Cu ores yielded ages of 166.6 ± 1.6 Ma (DB011) and 171.7 ± 2.0 Ma (DB020), with corresponding reverse isochron ages of 167.0 ± 2.0 Ma and $161.7 \pm$

1.7 Ma, respectively. The age data determined from Re–Os analyses of molybdenite and $^{40}\text{Ar}/^{39}\text{Ar}$ dating of sericite are in good agreement with each other, indicating that the porphyry Mo and stratiform Cu potentially originated from the same ore system and may be genetically associated with Jurassic granitic granodiorite porphyry. Based on the integrated geological, geophysical, and geochemical data, we proposed the Dabaoshan porphyry–skarn Cu–Mo–W–Pb–Zn deposit to be part of the Qin–Hang porphyry–skarn Cu–Mo ore belt that formed during the low-angle Jurassic subduction of the Paleo-pacific plate under Eurasian continent.

Keywords: molybdenite Re–Os isotope age; sericite Ar–Ar age; mineralization; Dabaoshan deposit