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河南内乡县板厂铜多金属矿辉钼矿 Re-Os 年代学及硫、铅同位素地球化学特征

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摘要: 板厂铜多金属矿床是东秦岭造山带近年来找矿取得重大突破的一处以铜为主的多金属矿床, 其上部发育脉状铜铅锌银矿化, 下部发育铜钼矿化。通过对矿石中辉钼矿开展 Re-Os 同位素定年、对花岗岩进行锆石 U-Pb 定年, 结合硫化物的硫、铅同位素特征, 讨论了矿床的成矿时代、矿床成因及成矿动力学背景。6 件辉钼矿 Re-Os 模式年龄为 149.8 ± 2.4 Ma ~ 151.5 ± 2.3 Ma, 加权平均年龄为 150.7 ± 1.9 Ma, 等时线年龄为 151.0 ± 4.6 Ma, 显示成矿作用发生于晚侏罗世。矿区南部纸坊沟花岗岩体的锆石 U-Pb 年龄为 148 ± 1 Ma, 说明区域上存在成矿期的花岗岩浆活动。11 件硫化物硫同位素 $\delta^{34}\text{S}_{\text{V-CDT}}$ 值介于 -1.2% ~ 1.2% , 显示深源岩浆硫的特征, $^{206}\text{Pb}/^{204}\text{Pb}$ 值为 $17.178 \sim 17.709$, $^{207}\text{Pb}/^{204}\text{Pb}$ 值为 $15.430 \sim 15.528$, $^{208}\text{Pb}/^{204}\text{Pb}$ 值为 $37.476 \sim 37.847$, 与北秦岭燕山期花岗岩和南秦岭地壳基底具一致的铅同位素组成, 明显不同于北秦岭地层的铅同位素, 成矿物质来源于燕山期岩浆岩。结合矿床地质特征, 研究表明板厂铜多金属矿床为与燕山期岩浆岩有关的类矽卡岩型-热液脉型铜多金属矿床, 属岩浆热液成矿系统, 形成于东秦岭造山带岩石圈减薄的构造背景。

关键词: 燕山期; 岩浆热液; 稳定同位素; 板厂铜多金属矿; 东秦岭; 年代学

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Molybdenite Re-Os Geochronology and S, Pb Isotopic Characteristics of Banchang Copper Polymetallic Deposit in Neixiang, Henan Province

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Abstract: A great breakthrough has been achieved in prospecting in Banchang copper polymetallic deposit, East Qinling orogenic belt in recent years, which is characterized by obvious mineralization zoning in the mining area. The Cu, Pb, Zn and Ag mineralizations are developed in the upper part, and the Cu and Mo mineralizations are located in the lower part of the mining area. With Re-Os isotopic dating of molybdenite, LA-ICP-MS zircon U-Pb dating of granite rocks, sulfur and lead isotopic tracing of metal sulfide, the metallogenic time, ore genesis and metallogenic dynamic setting of the deposit are discussed in this study. Re-Os model ages of six molybdenite samples are 149.8 ± 2.4 Ma to 151.5 ± 2.3 Ma, with the weighted average age of 150.7 ± 1.9 Ma and isochron age of 151.0 ± 4.6 Ma, indicating that the metallogenic epoch was late Jurassic. The zircon U-Pb age of

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