

广西富贺钟钨锡多金属矿集区稀有气体同位素特征及其地质意义

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中文摘要:桂东北富贺钟地区是广西重要的有色金属基地之一,在姑婆山复式岩体的西南缘产出有新路、水岩坝和珊瑚3个主要钨锡多金属矿田。本文对不同矿田典型矿床分别开展了稀有气体同位素研究,根据黄铁矿流体包裹体He、Ar、Ne同位素组成,进一步讨论了区内钨锡成矿流体来源和壳-幔成矿作用过程。结果表明,黄铁矿流体包裹体 $3\text{He}/4\text{He}=0.53\sim 4.53$ Ra、 $40\text{Ar}/36\text{Ar}=315.58\sim 600.55$ 、 $38\text{Ar}/36\text{Ar}=0.18688\sim 0.19102$ 、 $20\text{Ne}/22\text{Ne}=9.737\sim 9.848$ 、 $21\text{Ne}/22\text{Ne}=0.0291\sim 0.0304$,显示成矿流体为地壳流体、幔源流体和饱和大气水的混合物,成矿过程中有地幔物质的加入,地幔He约占8.7%~75.7%。结合区内成岩、成矿的测年资料及岩石成因等综合分析认为,区内中生代发生了多期次壳-幔相互作用,且作用强度经历了强→弱→强的演化过程,分别导致了姑婆山岩体主体岩性(165~160 Ma)和晚期细粒花岗岩(154~151 Ma)的侵入,以及钨锡多金属成矿作用(136~100 Ma),成矿与晚期的细粒花岗岩同位但不同时。

中文关键词:成矿流体 稀有气体同位素 钨锡矿床 广西富贺钟地区

Isotopic Characteristics of Noble Gases of the Fuchuan-Hezhou-Zhongshan W-Sn-polymetallic Ore Concentration Area in Northeastern Guangxi and Their Geological Significance

Abstract: Located at the conjunction of Fuchuan County, Hezhong City and Zhongshan County in northeastern Guangxi, the Fuchuan-Hezhou-Zhongshan W-Sn-polymetallic ore concentration area is one of the important nonferrous metal producing areas in Guangxi. It consists of three W-Sn-polymetallic orefields (Xinlu, Shuiyanba and Sanhu) lying on the southwestern margin of the Guposhan composite granite mass. In order to study the material sources and metallogenic mechanism of W-Sn-polymetallic deposits in the Fuchuan-Hezhou-Zhongshan ore concentration area, the authors analyzed the noble gases isotopic components of fluid inclusions in pyrite from the Baimianshan Sn-Zn deposit, the Shuiyanba W-Sn deposit and the Changyingling W-Sn deposit. The results indicate that $3\text{He}/4\text{He}$ ratios are $0.53\sim 4.53$ Ra, $40\text{Ar}/36\text{Ar}$ ratios are $315.58\sim 600.55$, $38\text{Ar}/36\text{Ar}$ ratios are $0.18688\sim 0.19102$, $20\text{Ne}/22\text{Ne}$ ratios are $9.737\sim 9.848$, and $21\text{Ne}/22\text{Ne}$ ratios are $0.0291\sim 0.0304$. The data obtained suggests that the ore-forming fluid was mixed with meteoric water, mantle fluid and crustal fluid, and the proportion of He derived from the mantle was $8.7\%\sim 75.7\%$. A synthetic analysis of the dating results of the Guposhan granites and mineralization as well as the genesis of granites shows that the Fuchuan-Hezhou-Zhongshan ore concentration area experienced poly-phase crust-mantle interaction in Mesozoic, and the crust-mantle interaction underwent the evolution from high intensity through low intensity to high intensity, resulting in the magmatic emplacement of Guposhan granites (165~160 Ma) and late fine-grained granite (154~151 Ma) as well as mineralization of the W-Sn-polymetallic deposit (136~100 Ma) respectively. The metallogenic epoch was later than that of late fine-grained granite, whereas the W-Sn-polymetallic ore bodies occurred in the same place as the late fine-grained granite.


keywords: ore-forming fluid noble gases isotope W-Sn deposit Fuchuan-Hezhou-Zhongshan area of Guangxi

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