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黄龙铺钼矿田含矿碳酸岩地球化学特征及其形成构造背景

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摘要:

陕西黄龙铺钼矿田是东秦岭钼矿带中成矿类型最为独特的矿床,多数矿体产于晚三叠纪(220Ma)的碳酸岩岩脉内。其中,石家湾II号矿体碳酸岩的Sr和REE含量异常高, $\delta^{13}\text{C}_{\text{PDB}}$ 为-6.75‰~-6.92‰, $\delta^{18}\text{O}_{\text{SMOW}}$ 为8.69‰~9.48‰,显示典型的火成碳酸岩的特征。在世界范围内,碳酸岩来自地幔低程度部分熔融或交代作用,稀土配分模式为陡倾斜的轻稀土富集型,但石家湾碳酸岩HREE含量异常高,稀土配分模式平坦,不同于世界其它地区的碳酸岩,这要求源区必须相对亏损LREE,相对富集HREE。显然,如此源区与俯冲洋壳部分熔融之后的残留榴辉岩的特征一致。因此,我们认为,勉略洋壳在三叠纪向北俯冲至秦岭-华北联合陆块之下,通过变质脱水熔融而形成岩浆弧,随后,在弧后扩张带发生残余榴辉岩的低程度部分熔融或交代而形成碳酸岩岩浆,导致黄龙铺矿田形成。如此以来,秦岭地区在220Ma左右仍有B型俯冲作用,碰撞造山作用并没有结束。

英文摘要:

The Hunglongpu Mo ore field is a unique metallogenic type in the East Qinling molybdenum mineralization belt. Most of them are associated with carbonatite dykes with molybdenite Re-Os age of 220Ma. Carbonatites collected from Shijiawan II deposit are characterized by high Sr and REE contents. C and O isotopic compositions of the calcites from the carbonatites are fallen into the range of the "primary igneous carbonatites" with the $\delta^{13}\text{C}_{\text{PDB}}$ and $\delta^{18}\text{O}_{\text{SMOW}}$ values ranging from -6.75 to -9.92‰ and 8.69 to 9.48‰, respectively, showing the typical characteristics of igneous carbonatite. It is generally accepted that carbonatite is produced by low degree partial melting or metasomatism of the mantle source with the characteristics of significant LREE-rich distribution pattern. But the carbonatites in Shijiawan II deposit have quite high HREE contents and flat REE distribution pattern, which is different from other carbonatites worldwide. This requires that the rock source must be enriched in HREEs and depleted in LREEs. Such characteristics of source are consistent with that of the residual eclogite which evolved through the partial melting of subducted oceanic crust. Therefore, we suggest that, when Mianlue oceanic crust subducted into the Qinling and North China Block in Triassic period, the magmatic arc formed through metamorphic dehydration and melting processes, then carbonatite magma was produced by low degree partial melting or metasomatism of the residual eclogite in back-arc extension area. The processes resulted into the formation of Hunglongpu Mo deposits associated with carbonatites. Therefore, there is still B-type subduction in the Qinling at about 220Ma, and the continental collision processes are not over yet.

关键词: [碳酸岩岩脉](#) [稀土元素](#) [构造背景](#) [黄龙铺钼矿田](#) [东秦岭钼矿带](#)

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