

The He-Ar-Pb-S isotope tracing on ore-forming fluid in Dabao Hill polymetallic deposit, South China

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The polymetallic deposit of Dabao Hill is a typical sulfide deposit in metallic deposit zone, south of China. A proposal is made in this paper to subdivide the Dabao Hill polymetallic deposit into vast-thick and vein-type sulfide. The $^3\text{He}/^4\text{He}$ values of the two types pyrite contained are from 0.60~4.13R/Ra, and $^{40}\text{Ar}/^{36}\text{Ar}$ values range from 327~411. From the Fig.1, we can conclude that the isotope compositions of helium and argon of the metallic fluid are mixed with the enrichment mantle and sea water. The vein-type sulfide was obvious under the vast-thick. Pb isotopes from the two different type sulfide were also measured in this study, $^{206}\text{Pb}/^{204}\text{Pb}$ values range from 18.6631~19.7561, $^{207}\text{Pb}/^{204}\text{Pb}$ values from 15.6852~15.7544, and $^{208}\text{Pb}/^{204}\text{Pb}$ values range from 38.8437~39.0355. And the sulfur isotope values in vast-thick sulfide were positive while the vein-type were negative. The lead and sulfur isotope with distinct characteristic suggested that the fluids of the vast-thick and vein-type sulfide was from different geology periods. The vast-thick deposit was formed in the sediment process of submarine exhalation which was from the deep of earth during the Devonian; The vein-type deposit might be filled with the hydrothermal magma in the Yanshan period. The old terrigenous rocks had important effect on the even metallic fluids. The organic matters and parts of seawater deoxidization reduced the $\delta^{34}\text{S}$ values of the vein-type sulfide. The organic matters evidently hydrothermal effects which was superimposition upon the syngenetic ore-forming processing, resulting in the formation of the present ore deposits.

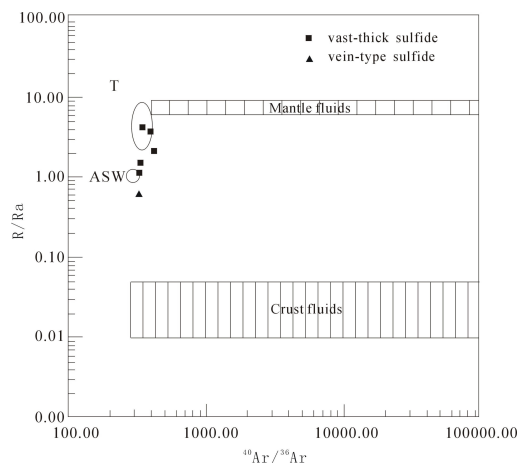


Fig.1 $^{40}\text{Ar}/^{36}\text{Ar}$ -R/Ra diagram of fluid inclusions in pyrites from Dabao Hill.