Mineralization features and metallogeny of polymetallic deposit in black shale series in Southwest China

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Black shale series is widely distributed in the Late Sinian-Early Cambrian in Southwest China. Its lithologic characters are: carbonaceous shale or slate, carbonaceous dolomite, siliceous dolomite, silicalite and phosphorite. It is accompanied with mineralization and enrichment of Mo, V, U, Hg and P. Its mineralization features and metallogeny are studied through systematic sampling and analysis.

The mineralization features are: (1) Black shale series is the source bed, in which the contents of U and other metal elements are higher. (2) Uranium mineralization is accompanied with the features of multi-elements. At present, the mainly found types include: U-P, U-Hg, U-Mo, U-V and U-Au. (3) Uranium mineralization occurs near the center of submarine hydrothermal venting-flowing of black shale series. At some special geological positions, such as the center of submarine hydrothermal venting-flowing, Mo, Ni and U, as well as platinum group elements, concentrate and mineralize. (4) Uranium mineralization in black shale series is obviously related with the transformation effect in the later period and is the necessity for the forming of large and rich uranium deposit in black shale series in Southwest China. There are apparent proofs for the later transformation effect on uranium mineralization in black shale series. For example, in Baimadong Uranium Deposit and Jinsha Uranium Deposit in Guizhou Province, the stratohorizons with uranium of higher content are all accompanied with fault structure, tectonic breccia and hydrothermal alteration of silicification.

Metallogeny of U-Polymetallic deposit in Black Shale Series in Southwest China mainly undergoes the following stages: 1) Early enrichment: Primary enrichment of Uranium of higher content (uranium anomaly) in the depositing and diagenetic period of black shale series is the prelude of metallization of Uranium deposit in Southwest China. 2) Later transformation effect: Transformation of the shallow fluid causes the re-enrichment of Uranium (uranium ore occurrence, small or middle-scale uranium deposit); 3) Superimposed mineralization: Superimposition and transformation of the deep fluid causes the formation of rich and large ore (large-scale Uranium deposit).

Geochronology and Sr-Nd-Pb-Hf isotopic compositions of gabbroic intrusions adjacent to Southern Shang-Dan Suture Zone in the Qinling orogen, central China

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Shang-Dan Suture Zone (SDSZ) is a main tectonic boundary between North and South Qinling belts in Qinling Oregon, central China, and marked by a discontinuous tectonic lens of island-arc volcanic-sedimentary rocks, which were intruded by gabbroic intrusions to south side of SDSZ in east Qinling. The U-Pb zircon age, Hf and whole-rock Sr-Nd-Pb isotopes for the gabbros are reported in order to assess their source signatures and tectonic settings.

The U-Pb ages of 478±11Ma and 434.7±4.4Ma have been obtained from Fushui and Ziyu gabbroic intrusion, respectively. Both of them have quite similar Pb isotopic compositions, of which the initial $^{206}Pb/^{204}Pb$ ratios of Fushui gabbros rang from 18.1154 to 18.3353 and the Ziyu gabrros from 18.0195 to 18.0851. However, the Fushui gabbros has much high initial $^{87}Sr/^{86}Sr$ (0.70785~0.71191) and negative $\varepsilon_{Nd}(t)$ (-5.43~-2.79), showing a relatively enriched mantle reservoir with DMM and EM2 signatures. In contrast, Ziyu gabbros possess low initial $^{87}Sr/^{86}Sr$ (0.70353~0.70426) and positive $\varepsilon_{Nd}(t)$ (+3.98~+4.19), displaying a slightly depleted mantle source. In addition, Ziyu gabbros posses a wide ranges of $\varepsilon_{Hf}(t)$=-39~+10, evidently indicating contamination resulted by the continental materials during transfer through crust. Furthermore, both gabbros are characterized by the island-arc magmas with a relatively enriched LILE, poor HFSE and evident depletion of Nb, Ta and Ti. Thus, we infer that both gabbroic intrusions have resulted from subduction-related processes during early Paleozoic, and the mantle source changes from the Fushui to Ziyu intrusions present subduction of the ancient Qinling oceanic crust during 478Ma and break off of the Qinling oceanic plate around 435Ma due to arc-continent collision.

This research project was supported by the National Key Basic Science Research Project of China (2009CB825003).