

Simulation of Water-rock Reaction Theory of Gold Ore In GanSu DaShui

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Revolutionary New Method

In the ore-forming fluid caused by hydrotherm, the solubility of calcite will increase gradually with the temperature decrease gradually and the concentration of CO₂ in gas increase. In a closed system, calcite will not deposit if it is the cooling action caused only by the falling of temperature. The ore-forming fluid with high temperature and the surrounding rock occur strong interaction, making the ore-forming fluid lose large number of hydrogen ion and take in plenty of calcium ion, magnesium ion, iron ion. In this process, the ore-forming fluid and surrounding rock will generate strong isotope exchange reaction. Under this reaction, the calcite will deposit with the gradual saturation of the ore-forming fluid. Therefore, the linear relation of $\delta^{13}\text{C}$ 、 $\delta^{18}\text{O}$ in calcite may be the results of water-rock reaction [Figure 1]. From this perspective, the characteristic of carbon-oxygen isotope composition may be the result of water-rock reaction, which explains that the water-rock reaction theoretical simulation can be used to study the source of the ore-forming fluid in DaShui gold ore [1,2].

Discussion of Results

The value of $\delta^{13}\text{C}$ shows the carbon in early mineralization stage of DaShui Gold ore mainly comes from the deep, otherwise the calcite relates to the dissolution of carbonate obviously. Carbon isotope shows that the ore-forming fluid in DaShui Gold ore could relate to magmation. In Addition, marine face carbonate is also the indispensable composition. The value of $\delta^{18}\text{O}$ shows the ore-forming fluid is magmation in early mineralization stage and atmospheric precipitation in later mineralization stage. It is out of question that atmospheric precipitation is the main role in the entire process, which agrees with preamble.

[1]Seward T M.1982. The transport and deposition of gold in hydrothermal systems. In: Foster R.P, ed. Proc. Gold 82: The geology, geochemistry and genesis of gold mineral deposits. Univ.Zimbabwe. 165~181.

[2]Terrence P. Mernagh. 2008.Transport and Precipitation of Gold in Phanerozoic Metamorphic Terranes from Chemical Modeling of Fluid-Rock Interaction. Economic Geology, 103:1613-1640.