

Constraint of extremely heterogeneous sulfur isotopes to the genesis of the Dajiangping pyrite deposit in Guangdong Province, China

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Abstract: The Dajiangping deposit, formed in the western margin of the Cathaysia plate after the Cryogenian, in the Yunfu area, Guangdong Province, China, is a large-scale pyrite deposit with reserves of more than 200 million tons. Based on the geological and geochemical characteristics of the deposit, previous researchers have confirmed its genesis of hydrothermal sedimentary. The pyrites of the deposit have extremely heterogeneous sulfur isotopic characteristics ($-26.7\text{‰} \sim 24.5\text{‰}$, range: 51.2‰), indicating relatively large differences comparing to the sulfur isotopes of the typical hot water deposition ore deposits. This sulfur isotopic characteristics could not be perfectly explained by some published genetic models. Based on geological observation of various profiles of various orebodies, systematic identification of rocks and minerals, as well as sulfur isotopic analysis of sulfide mineral separates, and in-situ analysis of sulfur isotopes of sulfide by using Nano-SIMS, the pyrite in the Dajiangping deposit has been classified into six types formed in three genetic stages, and then the hydrothermal sedimentary genetic model of the Dajiangping deposit has been modified.

Keywords: hydrothermal sedimentary mineralization; in-situ Nano-SIMS sulfur isotope analysis; lead-zinc differentiation; dajiangping pyrite deposit