

Genesis and geological significance of the low $\delta^{34}\text{S}$ pyrite in Yangla Cu Deposit, Yunnan Province, SW China

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Abstract: The Yangla deposit in the northwestern Yunnan is the largest Cu deposit in the Jinshajiang subzone of the Sanjiang metallogenic belt at present. Previous works have shown that the $\delta^{34}\text{S}$ -values of sulfides are mainly concentrated in a range from -4.20‰ to $+2.60\text{‰}$, indicating the sulfur of the ore-forming fluid of the Yangla deposit could be derived from mantle or deep crust. However, this study has obtained a batch of $\delta^{34}\text{S}$ values, ranging from -40.38‰ to -7.25‰ , of pyrites from the quartz-calcite-sulfide vein type ores formed in the late-ore stage. These $\delta^{34}\text{S}$ S values are obviously lower than those of sulfides reported by previous studies. It is believed that these low- $\delta^{34}\text{S}$ pyrites are closely associated with the mineralization in the late-ore stage, and they were precipitated in the ore-forming fluid probably mixed with the ^{32}S enriched fluid due to biological reduction of sulfate. The existence of low $\delta^{34}\text{S}$ S pyrites shows that the organic-bearing fluid has been involved in the ore-forming fluid in the late-ore stage of the Yangla deposit. Therefore, we propose that the fluid mixing might be responsible for the formation of quartz-calcite-sulfide vein type orebodies in the late-ore stage of the Yangla Cu deposit.

Keywords: low- $\delta^{34}\text{S}$ pyrite; ore-forming fluid; Yangla Cu deposit; SW China