

## Microbial-textures and in situ sulfur isotopic analysis of spheroidal and zonal sulfides in the giant Jinding Zn-Pb deposit, Yunnan, China

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### Introduction

The Jinding deposit in Yunnan, southwest China, is the largest sandstone- and conglomerate-hosted Zn-Pb in the world<sup>[1]</sup>. Micro-textures of spheroidal and zonal sulfides have been observed in the Jinding Zn-Pb deposit, including pellet-shaped aggregates of disseminated pyrite, concentric spots of galena and sphalerite associated with disseminated pyrite and such<sup>[2]</sup>.

### Results

They may have been directly or indirectly related to microbial activity and BSR. Micro-scale sulfur isotope analysis in different parts of the spheroidal and zonal sulfide aggregates, using (SIMS), revealed  $\delta^{34}\text{S}$  (VCDT) values as low as -48.4‰ for sulfides formed in the early-main stage disseminated ores in the western part of the deposit, possibly suggesting maximum sulfur isotopic fractionation through BSR<sup>[3]</sup>. Relatively elevated  $\delta^{34}\text{S}$  (VCDT) values (from -7.7‰ to -34.8‰, mainly from -10‰ to -20‰) for the late-stage, cavity-filling ores in the eastern part of the deposit, are interpreted to be possibly related to elevated temperatures close to the hydrothermal conduit and elevated  $\delta^{34}\text{S}$  values of the remaining sulfates resulting from the preceding BSR processes. Episodic influx of thermal mineralizing fluids temporarily and locally suppressed BSR and promoted TSR, resulting in variations of  $\delta^{34}\text{S}$  both at deposit- and micro-scale. Both BSR and TSR may have taken place contemporaneously in the Jinding dome during mineralization, with the former being best developed in areas away from the hydrothermal conduits, and the latter being mainly confined in the conduits.

[1] Xue et al. (2003) *Sci. In China* **46(8)**, 789-800. [2] Xue et al. (2007) *Ore Geo. R.* **31**, 337-359. [3] Tang et al. (2014) *Gondwana Res.* **26**, 594-607.