

Exploring the Sulfur Metabolic Pathway of Thermoacidophilic Archaeon *Metallosphaera Cuprina*

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The thermoacidophilic archaeon *Metallosphaera cuprina* was isolated from a sulfuric hot spring. *M. cuprina* is able to oxidize elemental sulfur, tetrathionate (S₄O₆²⁺) pyrite, and a range of low-grade ores, thus is attractive to biomining industry. Dissimilatory sulfur metabolism with a sulfur oxygenase reductase (SOR) system has been reported for members of *Sulfolobus* and *Acidianus*. But SOR system was not identified in the genome of *M. cuprina*. Recently, we have explored the sulfur metabolism of *M. cuprina* with genomic, proteomic, and biochemical tools. A hypothetical model of sulfur metabolism in *M. cuprina* was proposed on proteomic and genomic data, and proteins that involved in sulfur metabolism have been identified in our following studies. Specifically, DsrE/TusA homologs were biochemically characterized, and a novel thiosulfate transfer reaction was found during sulfur oxidation with *M. cuprina*. More recently, we cloned and identified a CoA-dependent NAD(P)H sulfur oxidoreductase from *M. cuprina*. The study will cover new understandings of the sulfur metabolism with *M. cuprina*.