

# Geochemistry of the Xiangquan Thallium Deposit, China

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Thallium occurs in many polymetallic ore deposits, where it is commonly associated with gold, arsenic, antimony and/or mercury [1]. The recently discovered Xiangquan thallium deposit in the Yangtze River region of China [2] is a new style of thallium-only mineral deposit.

At Xiangquan, thallium-bearing framboidal pyrite ores are hosted in a sub-series of the Ordovician Lunshan Group, a sequence of micrite interbedded with siliciclastic rocks, marls and massive pyrite beds. Geological features indicate that ore formation at Xiangquan probably occurred during two periods. The bulk of the thallium ore formed via Ordovician submarine hydrothermal activity during Lunshan Group sedimentation. Later metasomatism and remobilisation of thallium occurred in response to episodes of low temperature hydrothermal activity associated with the Yanshanian (Mesozoic) metallogenic event that affected much of eastern China. Results of Sm-Nd dating of fluorite grains that are intergrown with the remobilised thallium ores support this hypothesis ( $131.7 \pm 2.7$  Ma,  $79.3 \pm 9.4$  Ma) [3, 4].

Major, trace and REE element analyses, combined with isotopic analyses of sulfur, hydrogen, oxygen, lead and silicon from samples of framboidal pyrite, fluorite and altered wallrocks, have shown that the thallium-rich framboidal pyrite was deposited in the Ordovician from evolved, high-temperature seawater. In contrast, Yanshanian-age metasomatism was caused by meteoric fluids, which mobilised thallium from the framboidal pyrite, causing enrichment via the deposition of discrete thallium-bearing minerals.

## References

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