

REE characters of sulphide oxidation zone of Xinqiao massive sulphide deposit of Anhui, China

JIANFENG GAO AND JIANJUN LU

State Key Laboratory for Mineral Deposits Research,
Department of Earth Sciences, Nanjing University,
Nanjing, 210093, China (gao@icpms.nju.edu.cn)

According to oxidation intensity of the Xinqiao massive sulphide deposit, the sulphide oxidation profile can be roughly divided into four zones from the surface to the deep: intensive oxidation zone (Zone I), oxidation zone (zone II), weak oxidation zone (zone III) and primary sulphide zone (Zone IV). The total REE contents of the Zone III and IV (3837~6117 ppb and 1150~4513ppb respectively) are higher than those of the zone I and II (13~58ppb and 58ppb respectively). The zone III and IV have low Eu/Eu* values (0.60~0.72 and 0.51~0.66 respectively), whereas the zone I and II have high Eu/Eu* values (2.29~13.9 and 1.69 respectively). The zone I and II have the Ce/Ce* values of 0.42~0.69, showing obvious Ce negative anomaly, but the zone III and IV with Ce/Ce* values of 0.86~1.18 have no obvious Ce anomaly. Their REE distribution pattern (Fig. 1) shows that the zone I and II have obvious slope toward La and positive Eu anomaly, the zone III is characterized by strong LREE enrichment and negative Eu anomaly, and the zone IV has flatten REE distribution pattern and obvious negative Eu anomaly. These indicate that with the increasing oxidation degree the total REE contents and Ce/Ce* values descend and the Eu/Eu* values increase from the zone IV to the zone I. The total LREE contents and LREE/HREE ratios of the zone III are higher than those of other zones, suggesting that oxidation of sulphide minerals may resulted in strong enrichment of LREE in weak oxidation zone.

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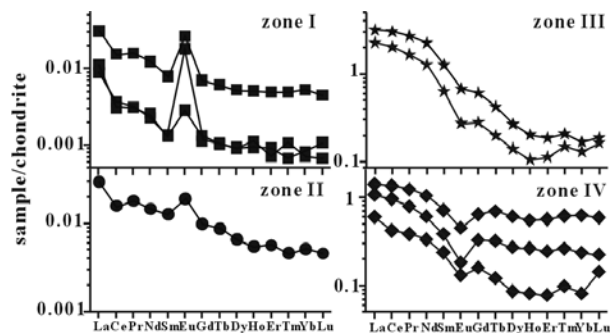


Fig. 1 Chondrite normalized REE distribution pattern

The red-clay-type gold deposit in China

ZHENMIN GAO, YU YUNMEI, ZHUSHEN YANG
AND WENBO RAO

Institute of Geochemistry, Chinese Academy of Sciences,
Guiyang, China, 550002

Large amounts of the red-clay-type gold deposits have been discovered in the southwestern China. This type is quite different from the lateritic gold deposit outside of China both in compositions and ore-forming mechanisms.

This type has following characteristics.

(1) *Tectonic*: Cenozoic structures provided favorite conditions for forming karst morphology and for forming ore-hosting reservoirs for the red-clay-type gold mineralization.

(2) *Lithology of parent rocks*: Parent rocks of this type gold deposits in China are mainly thick carbonate rocks, which are underneath the orebody of this red-clay-type gold deposit, have been intensively karst eroded.

(3) *Forms of orebody*: Forms and thickness of orebodies are controlled by the unconformity contacts underneath the weathering residuum.

(4) *The weathering residuum profile*: Most of red clay layers hosting gold deposits are relatively thin and did not develop mottled zone and ferruginous zone.

(5) *Chemical compositions*: The red clay layers which hosted the red-clay-type gold deposits in China contain high content of SiO₂ (> 55%), mainly less than 20% of Fe₂O₃ (with the highest of 25%), and less than 20% of Al₂O₃.

(6) *Mineral assemblages*: mineral assemblages include major illite and chlorite of 2:1 clay minerals, minor kaolinite and halloysite of 1:1 clay minerals, and trace iron and aluminum oxides and hydroxides.

(7) *State of gold*: Gold normally occurs nanometer sized tiny native particulates with majority of 50-500 nm and occasional micron in size.