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The Features of Sedimentary Facies and Copper Enrichment Metallogenic Regularities of Kuzigongsu Group in Sareke Glutenite Type Copper Deposits，Wuqia，Xinjiang

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1 Introduction

Sareke glutenite-type copper deposit is the large size copper deposit discovered in recent years, and it is located Sarekebayi intracontinental pull-apart basin in the western margin of the Tarim basin. Conglomerate of alluvial fan facies in the upper Jurassic Kuzigongsu group is ore-hosted bed for this copper deposit (Fang et al., 2015, 2016; Liu et al., 2014). On the basis of the study of the measured structural lithology section, the studied area of the Sareke copper mine was investigated by anatomical study of tectonic petrographic facies covering drilling holes and tunnels at the scale of 1∶1000 to 1∶200. Features of sedimentary facies for ore-hosted strata of the Kuzigongsu group, types of structure lithology, types of sedimentary microfacies in the upper member of the Kuzigongsu group, and copper mineralization in the Sareke copper deposit had been discussed.

2 The sedimentary facies features

The basement structural layer of the Sarekebayi pull-apart basin consists of the Mesoproterozoic Akesu Group Complex of Changcheng System. However, the Paleozoic strata are the upper basement structural layer. The Jurassic and lower Cretaceous continental clastic rocks are the basin-filling strata in this study area (Fang et al., 2015). The Jurassic stratum may be divided into the early Jurassic Shalitashen group (J_1s)、Kangsu group (J_1k) and middle Jurassic Yangye group (J_2y)、Taerga group(J_2t) and the upper Jurassic Kuzigongsu group(J_3k).

The Kuzigongsu group (J_3k) including two lithologic members is the ore-hosted strata, The lower lithologic member (J_3k^1) is a middle-fan sub-facies in a wetland-fan, and consist of conglomerate, sandstone and interbedding siltstone with horizontal and graded bedding. The main lithology comprises green-gray conglomerate and quartz sandstone with composition rhythm, feldspathic sandstone, argillaceous sandstone, and argillaceous siltstone. The bottom is purple argillaceous siltstone whereas the top is the stable brown-gray block conglomerate. The upper member (J_3k^2) is of the rapid accumulation of the middle-fan parfacies in the dry-fan, comprising conglomerate and sandstone lens with parallel bedding and bottom-scouring structure. It is the main ore-hosted layer for the Sareke copper deposit. The main lithology covers green, purple, brown gray massive conglomerate, lithic sandstone, and argillaceous sandstone lens. The top is gray quartz lithic sandstone and conglomerate with copper mineralization. Conglomerate is of angular gravel in poor separation, supported by particles, filled by sandy to politic. Biggest gravels in flat-shape arranged some directional property, indicating the characteristics of the accumulation of water channel. The top part of the sandstone is from glutenite to conglomerate with upward-coarsening. Because of tectonic inversion in the middle Jurassic, Sarekbayi basin had evolved into closed lake-basin, provided good paleogeographic conditions for formation of the Sareke glutenite type copper deposit.

3 Sedimentary micro-facies and copper ore-forming regularity

The Kuzigongsu group mainly comprise alluvial fan conglomerate, lenticular sandstone and siltstone. Tectonic lithofacies is characterized by the interlayer sliding structure superimposed on the pre-existing

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scouring-surface. Vertical lithofacies is made up of the middle-fan subfacies of the dry-fan facies overlapped the middle-fan subfacies of the wetland-fan, resulted in the formation of superposed compound-fan. Lithofacies combinations in the compound-fan included large-size washed-surface, the middle-fan parfacies, faulted valley, and Cu-bearing purple irony conglomerate (extensive oxidizing facies of geochemistry). Associations of tectonic lithofacies include interlayer-sliding fault, junctions of crack and fracture zone, and cataclastic lithofacies, black and grey-black bituminization facies (the extremely reduction facies of geochemistry). The chalcocite disseminated as stellated and veinlet cements filled in fractures of conglomerate. Copper orebody is hosted at the multiple coupling parts of structure-lithology-lithofacies (Fang et al., 2015, 2016). Cataclastic lithofacies was metallogenic geological signs. Copper mineralization distributions were strictly controlled by the middle-thick layer of conglomerates, a middle-fan subfacies of superimposed compound fan.

Sequence of vertical facies may be divided into five lithologic layer or microfacies. Copper polymetallic orebodies mainly are hosted in the second and third lithologic layer, followed by the fifth and the first lithologic layer. Firstly, the fifth lithologic layer is water-channel microfacies, indicated by purple fine conglomerate and superimposed by bituminization facies and cataclastic lithofacies. In the middle conglomerate of cataclastic lithofacies and bituminization facies fade gradually. The middle-fine gravels in conglomerate arranged in a flat-imbricate shape and locally lenticular lithic sandstone, specifying water-channel microfacies. Bituminization facies and chalcocite veins distributed along the fractures and broken cleavage in the cataclastic lithofacies, with hydrothermal cements of copper sulphides, pyrite, Fe-Mn-ankerite, and Fe-Mn-calcite. It was superimposed by basin fluid migrations of the hydrocarbon-rich and Fe-Mn-CO_3-type.

Secondly, the fourth lithological layer is purple argillaceous siltstone, lithic sandstone and granule-bearing sandstone, indicated a sheet-flow sedimentary microfacies. It periphery distributed in Sareke copper mine, assumed the thallus, partial to lenticular on longitudinal section.

Thirdly, the third and the second lithologic layers overlaid a middle-fan parfacies of the composite dry fan. They consist purple irony heterogeneous conglomerate. Its bottom was the scour surface microfacies in the superimposed fan, superimposed not only by extensive cataclastic lithofacies lately but also by black to grey-black bituminization and discoloured alteration. These parts are mainly ore-hosting for occurrence of the main industrial orebody in Sareke glutenite-type copper polymetallic deposit. Digenite, chalcocite, bornite, and chalcopyrite are hydrothermal cements in conglomerates, showing that copper enrichment and mineralization were mainly controlled by multiple coupling factors of tectonic lithofacies, including conglomerates of middle fan parfacies, cataclastic lithofacies, black bituminization facies, discoloured alteration facies, washing-surface microfacies (initial metallogenic structural plane) formed between the second floor lithologic layer and the first lithologic layer. Washing-surface microfacies were marked by lenticular conglomeratic grits including the gravel sandstone and argillaceous siltstone.

Finally, the first lithologic layer is the middle-fan parfacies in the dry fan, and consist of purple iron giant conglomerate sieved deposition microfacies and debris flow microfacies. Small industrial copper orebody were hosted in interlaminar fractured and faulted zone in the first lithologic layer with the strong bituminization.

In short, Sareke copper polymetallic deposit was mainly controlled by microfacies types of the middle-fan subfacies, including washing-surface, water-channel, sheet-flow microfacies (initial metallogenic structural plane) in the superposition compound fan, and superimposed by cataclastic lithofacies, discoloured alteration facies, black bituminization facies (tectonic lithofacies later superimposed by basin fluids) formed during basin deformation and intruded by the OIB-type, gabbro-diabase intrusions in the Late Cretaceous to Palaeogene ages.

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References

Fang, W.X, Jia, R.X., and Guo, Y.Q., 2016.Hydrocarbon-rich Basin Fluid with Reductibility and Metallogenic Mechanism for Glutenite-type Cu-Pb-Zn-U Deposits, *Journal of Earth Sciences and Environment.* 38(6): 727–752.

Fang, W.X, Jia, R.X., and Wang, L., 2015. The metallogenic regularity of large glutenite type copper polymetallic deposit in Sareke, Xin Jiang, *Acta Mineralogica Sinica* (*Supplement*):202–204.

Liu, Z.R, Qi, S.J., Tian, P.R., 2014. Determination of age and its significance of ore - bearing strata of the Meso - Cenozoic glutenite type lead – zinc - copper deposit in the northwestern edge of Tarim basin, Xinjiang. *Mineral Exploration.* 5(2):149-158.