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On Mineralize-halo-forming Mechanism of Sareke Glutenite-type Copper Deposit in Xinjiang

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1 Introduction

Sareke glutenite-type copper deposit is located in the Sarekebayi basin, a sub-basin of southwest margin of the Tuoyun Mesozoic hinterland basin in the northwestern part of the Tarim Basin. The Tuoyun Mesozoic hinterland basin may be formed between the Southwest Tianshan Hercynian orogenic belt and the Kuokeshaling Palaeozoic arc-type orogenic belt. Strata exposed in the study area include the Mesoproterozoic Akesu Group Complex, Silurian system, the lower Jurassic Shalitashi group and Kangsu group, the middle Jurassic Yangye group and Taerga group, the upper Jurassic Kuzigongsu group, the lower Cretaceous Kezilesu Formation. The Kuzigongsu group is a set of purple-celadon mingled conglomerates. The ore-bearing strata of the Sareke copper deposit is hosted at the upper part of the Upper Jurassic Kuzigongsu Group (Fang et al.,2014, 2015,2016), the main lithology associations are conglomerate，pebbly-bearing sandstone, and lens-layer greywacke. The lower part of the Kuzigongsu Group consists of celadon conglomerate, pebbly-bearing sandstone, lithic sandstone and siltstone with purplish grey, with the symbol layer of the celadon conglomerate in a stable layer at the its bottom. Previous geochemical survey methods of the stream sediment and soil on the slopes in Sareke copper deposit in Xinjiang had the best prospecting achievements in the find of the Sareke glutenite-type copper deposit (Gao et al ., 2005; Hu et al., 2014; Fang et al., 2012). However, its secondary halo-forming mechanism for the Sareke glutenite-type copper deposit with great significance is to be uncovered in detail.

Copper has the maximum variation coefficient in the Jurassic strata and the other's stratum in the Sareke copper deposit while concentrations of Pb and Zn in the Cretaceous strata are high with large coefficient of variation. However, Pb, Zn, Cu, Sr, Ag, and Ba are of higher background and local enrichment in the Cainozoic stratum. The nine integrated geochemical anomaly focusing on copper delineated by the stream sediment geochemical survey at the scale of 1:50000, may be roughly divided into three prospecting area. The northern Sareke anomaly area, the Sareke copper anomaly area, and the southern Sareke anomaly area, were targets for mineral prospecting.

2 Methodology

Sampling sites for HS-6 anomaly area in the fourth exploration line in this study area in the Sareke copper anomaly area. The HS-6 anomaly is dominated by Cu, Pb, Zn, Ag, Ba, and Bi in order to exploration copper deposit, accompanied by the anomaly of As, Au, and Sr. Site copper ore samples were analysed by chemical phase for Cu, Pb, and Zn in order to studies on their secondary halo-forming mechanism in the Sareke glutenite-type copper deposit.

Geochemical phase or trace chemical phase is used to study on the secondary halo-forming mechanism for Cu, Pb, and Zn concentrations may be low-grade in the sampled sites. However, chemical analysis of ore phase was adapted for the sampled copper sites for they may have higher-grades in copper concentrations.

3 Analysis of Mineralize-halo-forming Mechanism

Using the chemical phase analysis the sample in Sareke copper deposit, the results showed that, the

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copper elements are mainly hosted in the form of sulphide facies, a small amount of copper elements are hosted in the form of oxidized facies and the combined facies, the existence of oxidized facies copper reflected that copper had secondary enrichment. And we can speculated that a large amount of hydrocarbon-rich basin fluid with reducibility reduced the oxidized facies copper, including the formation of chalcocite, bornite, chalcopyrite and covellite.

The analysis found that, the existence of oxidized facies copper, including silicon malachite, cuprite, malachite and azurite. Oxidized facies copper revealed that copper has secondary enrichment mineralize and halo effect in the study area. As we can see malachite copper ore-body in the Sareke outcrop, so copper elements have the character of hypergene mineralize and halo effect. The phenomenon that copper element is mainly hosted in the form of the facies of secondary sulphide, the facies of oxidized and combined following, a very small amount of copper hosted in the form of the facies of native sulphide. All above, revealed the copper is experiencing a secondary enrichment superposition.

Copper mineralize-halo-forming mechanism may be that a large amount of hydrocarbon-rich basin fluid with reductibility reduced the oxidized facies copper. The diabase gabbro vein has the obvious superimposed mineralize effect, formed the altered diabase with copper and fade alteration zone with copper surrounding. In hypergene condition, the copper mineralized secondary, forming chalcocite, azurite, malachite, tenorite, and the enrichment of oxidized facies copper, revealed not only the existence of copper of secondary mineralization, but also the development of copper of secondary dispersion halo-forming effect. Because of the north glutenite-type copper ore-body in Sareke and the south glutenite-type copper-lead-zinc ore-body in Sareke was exposed in a large elevation. These ore-bodies were mechanical weathered and chemical weathered on the surface, then forming a large scale debris flow along the slope, and the formation of the mechanical dispersion halo. Therefore, to adapt the methods of the stream sediment and soil on the slopes in Sareke copper deposit in Xinjiang may become a very effective means of exploration.

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