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Comparisons between the Zhuchong Fe-Cu Deposit in Anqing and the IOCG-type Deposits

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The iron oxide-copper-gold deposit (IOCG) deposit is an important deposit known since 1990s'. Because of its large reserves and multi available elements, as well as being as the shared attribute between some world-class deposits, the study of IOCG has become the focus of the mining industry (Sillitoe, 2003; Corriveau et al, 2006; Cox and Singer, 2007; Mao et al, 2008). Zhuchong deposit in Anqing is a newly discovered Fe-Cu deposit, and this article will compare it with IOCG-type deposits in research and put forward the possibility that it belongs the IOCG-type deposits for the first time.

1 Geological Background and Characteristics of Zhuchong Fe-Cu Deposit

Zhuchong mining area in Anqing is located in the east of the arc-shaped Fe-Cu belt along Middle-Lower Reaches of the Yangtze River, and geotectonically located at the northern margin of the Yangtze paraplatform. The exposed strata in the mining area includes Precambrian to Mesozoic, with the mineral related strata Permian and Triassic in age. Favorable magmatic rocks and ore occurs in a series of large-scale NE trending folds, faults and interlayer decollement, formed by the Yangtze block and the North China block collision in the Mesozoic.

Zhuchong mining area mainly exposed Middle Triassic Period Yueshan formation brecciated dolomitic limestone containing gypsiferous rock, calcareous siltstone intercalated with marlite, dolomite and Tongtujian Formation siltstone. Structural conditions of the mining area are complex, the NE Lujiang-Huaining buried fault and nearly EW trending basement faults controlled deep area of magmatic rocks and ore distribution (Zhou, 1995). Yanshanian magmatic rocks are well developed, and Yueshan rock body accounted for the major. The deposit is located in the contact zone of rock body and carbonates containing gypsiferous rock.

2 Comparisons between the Zhuchong Fe-Cu Deposit and the IOCG-type Deposit

Following similarities are summarized from the comparative analysis of Zhuchong Fe-Cu deposit and IOCG-type deposits:

The known IOCG-type deposits metallogenic tectonic environment include continental orogenic collapse area, continental non-orogenic magmatism environment and the extensional environment in active continental margin (Hitzman et al., 2000), among which the most common are the extensional environment in Craton or continental margin; If the extend of metallogenic epoch of Zhuchong deposit is limited by the diagenetic age of Yueshan rock (135Ma ~ 139Ma), noticeably that deposit was formed in extensional tectonic environment, similar to IOCG-type deposits' metallogenic tectonic environment.

The orebody morphology of IOCG-type deposits are mainly vein like, tabular, bedded, stratoid, irregular shaped and tubular breccia ore (Hitzman et al, 1992; Bergman et al, 2001.). Zhuchong deposit orebody morphology are mainly tabular and irregular shaped orebody developed in interlayer collapse controlled by contact zone, lenticular shaped orebody developed in Yueshan formation gypsolyte within tectonic weak zone, net vein-veinlet disseminated shaped orebody developed in the rock fracture, which are coinciding with IOCG-type orebody morphology.

It is considered that the IOCG-type deposits and Zhuchong deposit ore shares highly similar ore-forming element assemblage. IOCG-type deposits is firstly characterized by Fe, Cu, Au and low titanium magnetite and hematite. Zhuchong deposit ore minerals are mainly composed of magnetite, chalcopyrite, hematite and nature gold. The low titanium magnetite is an important characteristic of IOCG-type deposits, and according to Dupuis and Beaudoin's (2011) statistics analysis of 11 IOCG-type deposits, the average content of TiO_2 in those

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deposits is 0.04% (Dupuis and Beaudoin, 2011); Similarly, the content of TiO_2 in magnetite in Zhuchong deposit is low level (between 0.02%~0.21%, average content is 0.08%).

According to Mao et al. (2008), the IOCG-type deposit containing magnetite with albitization, and the IOCG-type deposit with hematite potash feldspathization; Respectively, the wall-rock alterations of Zhuchong deposit from the lowest part to the top are diorite with albite alteration, contact zone with magnetite-diopside-epidote-actinolite belt, then diorite with potassium feldspar and the Tongtougian formation hornfels with albite-chlorite-carbonate. These assemblages are very similar to the wall-rock alteration features of IOCG-type deposits. From these geological and geochemical evidence listed above, Zhuchong Fe-Cu deposit is likely to belong to the typical IOCG-type deposits.

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