# Establishion and Authentication for Geochemical Anomaly Structure of Shaquanzi Cu-Ni Sulfide Deposit in Xinjiang, Eastern Tianshan Mountains

LI Jianjun*

*Geological surveying and mapping institute in hebei province, No.30 Shuguang Road, Langfang 065000, Hebei, China*

Citation: Li, 2019. Establishion and Authentication for Geochemical Anomaly Structure of Shaquanzi Cu-Ni Sulfide Deposit in Xinjiang, Eastern Tianshan Mountains. *Acta Geologica Sinica* (English Edition), 93(supp.2): 434.

**Abstract**: Located in the south of Hami basin of Xinjiang , the Shaquanzi Cu-Ni sulfide deposit is one of important deposits in the Aqishan-Yamansu belt of eastern Tianshan. Based on main element and trace element and REE geochemistry , this paper deals with the geochemical anomaly zoning and establishion for anomaly structure and also discusses ore genesis of the deposit. The samples are taken from 3 boreholes including ZK0501, ZK0502 and ZK0503 on the section of exploration line No. 5 in Shaquanzi test area. The results are as follow. (1) Based on the anomaly distribution of elements, the Shaquanzi copper and nickel sulfide deposit developed a series of hydrothermal alteration after the magmatic stage, which is similar to that of typical hydrothermal deposits. The concentration distribution of elements on the rock mass is displayed, and the ore body is the center. The content of positive anomaly elements such as Ni, Cu, and Co gradually decreased outwards. From the center of the original anomaly concentration of each element, Cu, Ni, Co, S, Te, and Au are obvious as the basic characteristics of the elements under the ore in the ore-bearing rock mass, and Ag, Bi, and Se are near-ore indicator elements. As, Mo, and mineralizer elements Cl exhibit the characteristics of elements on or front of mineral body. With reference to the zonation calculation method of hydrothermal deposits, zonation index and variability index of these elements are calculated respectively, and the geochemical anomaly zonation sequence of shaquanzi Cu-Ni sulfide deposit is established as following: (As, Mo, Cl) - (Se, Ag, Bi) - (Te, Au, Co, S, Cu, Ni). (2) The geochemical properties of Rb and $K_2O$ are similar, and the negative anomaly patterns are basically the same. From the center of the ore body to the sides, an order of magnitude gradient band appears in the content of the element Rb, and $K_2O$ also exhibits obvious distribution characteristics in multiples. The negative anomaly formed by Th and Tl are in agreement with the ore body, and also show significant concentration distribution. It is speculated that the reason for these negative anomalies may be due to the fact that the base-ultrabasic rock body invades the formation and releases a large amount of heat energy during its cooling process. This heat energy activates the elements originally in the surrounding rock and causes them to deplete. That is, taking the orebody as the center, the content of positive anomaly elements such as Ni, Cu, and Co gradually decreased outwards, and the content of elements such as Rb, $K_2O$, Th, and Tl that formed negative anomalies gradually increased, and the positive anomaly corresponds to the negative anomaly space position. (3) LA-ICP-MS analyses show that magnetite contains low V, Cr and Ti, indicating that magnetite was derived from the hydrothermal process rather than from the magmatic differentiation. Besides, the pattern of REE partition of dense impregnated and massive ore sulfides is characterized by "triple bending", which also indicates that the molten layers of rich ore magma and ore slurry formed by deep melting off contain a large amount of fluid components. Combined with previous studies, the authors hold that the Shaquanzi Cu-Ni sulfide deposit may be of the volcanic hydrothermal replacement type.

**Key words:** geochemical anomaly structure, trace elements, rare earth elements, Cu-Ni deposit, eastern Tianshan Mountains, Xinjiang

## References

Abraitis P.K., Pattrick R.A.D., and Vaughan D.J., 2004. Variations in the compositi onal, textu ral and electrical properties of natural pyrite: A review. *International Journal of Mineral Processing*, 74(1–4): 41–59.

Huang X.W., Qi L., Meng Y.M., 2013. Trace element and REE geochemistry of minerals from Heifengshan, Shuangfengshan and Shaquanzi (Cu-)Fe deposits, eastern Tianshan Mountains. *Mineral Deposits*, (06): 1188–1210.

Lottermoser B.G., 1992. Rare earth elements and hyd rothermal ore formation processes. *Ore Geology Reviews*, 7(1): 25–41.

Rusk B.G., Oliver N.H.S., Zhang D., 2009. Compositions of magnetite and sulfides from barren and mineralized IOCG deposits in the eastern succession of the M t Isa Inlier, Australia. R. Society for Geology Applied to Mineral Deposits, 10th Bi-ennial SGA Meeting. Townsville, Australia.

## About the corresponding author

LI Jianjun, Male, born in 1984 in Yuanshi County, Hebei Province; master, graduated from China University of Geosciences (Beijing); geological engineer of geological surveying and mapping institute in hebei province. He is mainly engaged in the study on geology and mineral exploration. Email: lijianjun8686@163.com; phone: 18733657865

* Corresponding author. E-mail: lijianjun8686@163.com