An Identification of Pb-Zn-Ag Mineralization by Applying Positive S and Negative Na$_2$O Anomalies

S.X. TANG* AND S.M. MA

Institude of Geophysical and Geochemical Exploration, CAGS, Langfang 065000, China (*correspondence: 187322315@qq.com)

The effectiveness of using conventional geochemical prospecting indicators, in terms of ore-forming and associated elements is controversial and has been found to be inaccurate, thus causing difficulties in recognizing and identifying deeply buried minerals[1]. In order to resolve this matter, one of the potential solutions, may be by extending the number of current geochemical prospecting indicators using some of the elements beyond the ore-forming and associated elements, such as sulphur (S) and sodium oxide (Na$_2$O).

The Gaoshishan area located in Inner Mongolia, shows relatively high potential of prospective geological settings for mineral prospecting, however the previous mineral exploration results have been relatively negative, thus, a review of the prospecting methods and use of indicators such as sulphur (S) and sodium oxide (Na$_2$O) in order to discover new prospects in this region. First of all, the authors performed a detritus geochemical survey at a scale of 1:25,000, covering 260 square kilometers, in the Gaoshishan area using the theory of Multi-dimensional Anomaly System[2]. Subsequently, the results showed there were significant positive S and negative Na$_2$O anomalies on the Silurian andesite and andesitic tuff. In contrast, the ore-forming and associated elements indicated neither obviously positive nor negative anomalies. Based on the above results, an area covering 10 square kilometers was optimized for more detailed detritus geochemical survey at a scale of 1:10,000 by considering the integrated characteristic of the positive S and negative Na$_2$O anomalies. After the finalization of the more detailed survey, a Pb-Zn-Ag anomaly association with the length of ~3 kilometers over a width ranging from 200 to 300 meters, was successfully identified. In this anomaly association area, the highest concentration of Pb, Zn and Ag are 3618×10^{-6}, 2551×10^{-6}, and 20000×10^{-9} respectively, showing relatively high and obvious multi-metal mineralized intensity. By resorting to a scientific and reasonable combination of positive S and negative Na$_2$O anomalies has not only lead to a discovery of Pb-Zn-Ag multi-metal mineralization in Gaoshishan area, but has also been successful in identifying the use of S and Na$_2$O as prospecting indicators in this particular type of mineralization.

[1] Coker, W.B. (2010), GEEA 10, 75–80. [2] Ma, S.(2014), Journal of Jilin University 44, 134-144