

## **Nanoparticles of Ag-Zn in Earthgas deriving from a concealed Ag-Pb-Zn deposit, Inner Mongolia, North China**

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In recent years, mineral exploration has concentrated on concealed deposits in diverse regolith-covered terrains. A variety of penetrating geochemical methods have been developed to detect the concealed deposits<sup>[1]</sup>. In these methods, NANOScale Metals in EarthGas (NAMEG) shows a greater success than conventional geochemical methods<sup>[2]</sup>. Whereas, it is still deficient of the evidence that whether the nanoscale metals in Earthgas is deriving from concealed ore deposit.

Bairendaba deposit is a polymetallic Ag-Pb-Zn-Cu ore, covered by eolian sand in North China<sup>[3]</sup>. In this study, metallogenic elements content of Ag, Pb, Zn, Cu in Earthgas samples collected both in mining area and background area were analyzed with ICM-MS. The existence forms and geochemical components of nanoparticles in Earthgas and ore were observed by TEM. The result are as follows: (1) the content of Ag, Cu, Pb, Zn in the Earthgas samples collected from mining area is 2.3, 1.4, 1.6 and 4.6-fold greater than that from background area, (2) a lot of Ag-, Zn-,Cu-, Pb-, and Sn- bearing particles were observed in Earthgas samples collected from mining area and little observed in Earthgas samples collected from background area, (3) similar forms of nano-scale Ag particles were observed in both Earthgas and ore samples. The result indicates that the nano-scale metal particles in Earthgas extremely likely derive from concealed ore deposit. The result also provides direct observation evidence for deep-penetrating geochemistry using geogas as sampling media to search for deeply concealed ore deposits.

[1] Wang et al. (2016) *Ore Geol. Rev.* **73**, 417-433.

[2] Wang et al. (1997) *J. Geochem. Explor.* **58**, 63-72.

[3] Liu et al. (2016) *Ore Geol. Rev.* **75**, 150-173.