

Findings of gold nanoparticles by TEM in geogases and soils over a concealed gold deposit

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Since the term “geogas” (namely ascending gas flow) was proposed by Kristiansson K and Malmovist L in the 1980s [1], many researchers have found metals in the geogases [2]. However, no direct evidence has been observed to demonstrate the occurrences and formation of the metals.

To investigate it, metals in geogases and soils were first collected over a concealed gold deposit and its background region in desert terrain. Then they were observed using a transmission electron microscope (TEM) equipped with an energy dispersive spectroscope. The observation results showed that gold-bearing nanoparticles occurred in geogases and soils over the ore body. Particle diameters of gold range from several nanometers to hundreds of nanometers. The gold nanoparticles tend to occur in clusters and occur as alloys. Another one important thing is that there are no gold nanoparticles in geogas and soil samples collected from the background region.

As is known to all, gold is the most noble of all metals. It can not be imagined that gold can migrate tens of metres from orebody to the surface through chemical dispersion or mechanical dispersion in desert terrain where groundwater is too deep to help the migration of gold. Findings of gold nanoparticles in geogases and soils over a concealed gold deposit indicated that 1) ascending gas flow may play an important role in the migration of gold from the underlying concealed ore body to the surface; and 2) the nanoscale particle is the main form for gold to be transported by geogases; and 3) nanoparticles can be trapped by soil geochemical barriers during their upwards transportation.

This work is financed by the SinoProbe Project (SinoProbe-04-03) and the National Natural Science Foundation of China (41203038).

[1] Kristiansson *et al* (1982). *Geophysics*, **47**, 1444-1452 [2] Wang *et al* (1997). *Journal of Geochemical Exploration*, **58**, 63-72