



The Relationship between Gold Mineralization and the Orogenic Process: Take the Pangjiahe Gold Deposit as an Example

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The Pangjiahe deposit is one of the large gold deposits in the Fengtai Mineral Cluster, central Qinling Orogen. It has never been deeply researched and reported before. Therefore, it will be necessary to understand its ore genesis and potential of the deep and periphery part after longtime mining.

During the two months field work, some basic recognition has been put forward:

1. The Pangjiahe gold deposit is strictly controlled by the parallel faults. The mineralization stably stretches from the surface to 740m, controlled by the drill hole, and from exploration line 45 to line 30. The ore occurrence shows a result of expansion and contraction, branch recombination and thinning out in strike and dip. Hopefully, the geophysics data (CSAMT) indicate well extensions of the ore bearing faults to the deep part;

2. The Pangjiahe gold deposit exhibits strong spatial relationship with granitic porphyry dykes. The granite dykes show same occurrence with ore bodies, without any crosscut. Moreover, it mineralized randomly. Actually, the present sulfur and lead of pyrite, oxygen and hydrogen isotope of auriferous quartz study indicate it may have genetic relationship with magmatic system;

3. The alteration of the Pangjiahe gold deposit is dominated by sericitization, silicification and later carbonation. Similar to most sedimentary hosted gold deposit, the large numbers of EMPA analysis of pyrite, the auriferous mineral, in the Pangjiahe gold deposit are characterized by chemical zonation (Large et al., 2011; Large et al., 2009). However, what really makes it difference is the pyrite in mineralized granite also has this kind of chemistry zonation which has never been reported before, and the low arsenic pyrite core in mineralized granite and phyllite contain gold as well. Normally, the high arsenic rim always contains arsenopyrite, galena and other minerals with base metals. It is easy to find native gold in high grade phyllite and granite ore rocks, not only in the high arsenic pyrite rim but also in the matrix.

The Pangjiahe gold deposit has been thought as carlin-like (Chen et al., 2004) or orogenic (Mao et al., 2002) gold before. According to the detailed research result, we believe that it formed during the orogenic process with strong effect, both the fluid and the metal, of the granite porphyry, which is different from the typical orogenic gold (Goldfarb and Groves, 2015) deposit.

References:

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