Apatite fission track constrains on the mineralization of Dashui Gold deposits, northern Qinghai-Tibet plateau

W. YUAN[1]*, Z. BAO[2], J. DONG[2], H. LI[3] AND D. JUN[1]

[1]State Key Laboratory of Geological Processes and Mineral Resources, China University of Geosciences, Beijing, 100083, China (*correspondence: ywm010@yahoo.com)
[2]Laboratory of Nuclear analysis techniques, Institute of High Energy Physics, Chinese Academy of Sciences, Beijing, 100039, China
[3]Shijiazhuang University of Economics, Shijiazhuang, 050031

Dashui gold ore district is located at southern foot of Xiqingshan Mountains, northern Tibet-Qinghai plateau. The gold deposit belongs to low-to-moderate temperature magmatic hydrothermal deposit.

The quartz diorite samples have apatite fission track ages (FTAs) of 132-189 Ma and average track length of 13.6 μm; alteration quartz diorite are 135-156 Ma and 13.7 μm; the ore samples are 107-168 Ma and 13.4 μm, and the breccia samples are 119-160 Ma and 13.1 μm. Thus, it can be seen that the quartz diorite has the highest fission track age, the ore takes second and the magmatic cryptoexplosion breccia is lowest.

It is known that there are $^{40}Ar/^{39}Ar$ plateau age of 222.5~235 Ma for the diorite. In view of much lower retention temperature of the apatite FTA than the that of $^{40}Ar/^{39}Ar$ age, the average FTA of 158 Ma for the quartz diorite and 140 Ma for the breccia basically accord with these isotopic ages. Meanwhile, because metallogenic temperature was 130-294°C in the ore district, we consider that these apatite FTAs could represent the ending time of the mineralization. The reason that the breccia has the lowest fission track age is that the cryptoexplosion breccia occurred in postmagmatic stage. The breccia intrusion could have resulted in a hydrothermal mineralization which overlapped the early stage of mineralization. It is that the magmatic breccia overlaping thermal event prolonged whole mineralization duration.

Effect of humic acid on absorption and partition of heavy metals for the Changjiang estuary sediment

X.Y. YUAN AND Y. CHEN

College of Environmental Science and Engineering, Hohai University, Nanjing, China (netyxy @ yahoo.com.cn)

Organic matter in sediments varies significantly in the estuary region. It plays a major role in absorption and partition of metal pollutants for sediments.

Sediments were collected in the Changjiang estuary, which have low organic matter and heavy metals. The humic acid (HA) with 0%, 1%, 3%, 5% and 10% of sediment weight were mixed with sediments. Heavy metals added in the experiment depended on the half-death content of *Scallop* in 48 hours and the partition coefficients between water and sediment. The forms of heavy metals were determined by AAS with BCR sequence extraction method.

Results showed Cu and Pb increased rapidly from zero to 3% HA, and keep stably then in sediments. Zn and Cd increased slightly. The soluble fraction decreased and the oxidisable fraction increased for Cu, the reducible fraction increased evidently and the other three fractions decreased slightly for Pb. The reducible Zn increased and the residual fraction decreased slightly. The effect of humic acid on Cd was not significantly. So we think humic acid makes an obviously effect to Cu and Pb, but a trifling effect to Zn and Cd in sediments from the Changjiang estuary.

The partition of metal speciation is not only associated with organic acid, but also with the properties of heavy metals and the bound forms. The oxidisable form is dominant for Cu and Pb, and it has the strong combining ability with HA. Zn and Cd mainly exist in the soluble fraction and the residual fraction, they are not easy to integrate with HA. Otherwise, the different complicated modes between metals and HA (inner and external complication) also take an important function to impact on the bioavailability of heavy metals in the estuary sediment.