

## Geochemistry feature of F10 fault and ore prospecting in Fengshan copper deposit, Yimen, Yunnan, China\*

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Yunnan Yimen Fengshan copper deposit is located at south central of the Kunyang Rift, which is the typical structural ore-control deposit. F<sub>10</sub> fault is the major fault of mining area. vein deposit is saved in the catalastic dolomite that belongs to Mesoproterozoic Lvzhijiang Formation of the footwall F<sub>10</sub> fault. Main mineral is Chalcopyrite.

Through the analytical studies of 12 samples from the zone, the content of major elements in F<sub>10</sub> fault zone, such as SiO<sub>2</sub> 55.56 ~ 64.50×10<sup>-2</sup>, Al<sub>2</sub>O<sub>3</sub> 14.47 ~ 18.30×10<sup>-2</sup>, TiO<sub>2</sub> (0.70 ~ 0.93×10<sup>-2</sup>) MgO 1.65 ~ 3.57×10<sup>-2</sup>, K<sub>2</sub>O 1.82 ~ 2.68×10<sup>-2</sup>, Fe<sup>3+</sup>/Fe<sup>2+</sup> 0.45, SiO<sub>2</sub> + Al<sub>2</sub>O<sub>3</sub>, TiO<sub>2</sub> is the positive correlation with the copper mineralization. The content of CaO+MgO is the negative correlations with the copper mineralization. The trace element is characteristic as concentration of Zn (35.72 ~ 59.14×10<sup>-6</sup>), Cd (0.114 ~ 0.206×10<sup>-6</sup>), Ag (2×10<sup>-6</sup>), Tl (0.91 ~ 1.26×10<sup>-6</sup>), Bi (0.26 ~ 0.31×10<sup>-6</sup>), Mo (2.03 ~ 2.33×10<sup>-6</sup>), Pb (25.4 ~ 54.6×10<sup>-6</sup>), Co (31.1 ~ 36.2×10<sup>-6</sup>), Cu (0.28 ~ 0.46×10<sup>-2</sup>), It is positive correlation with the copper mineralization. REE 230.78 ~ 233.87×10<sup>-6</sup>, LREE/HREE 4.44 ~ 5.51, δEu 0.50 ~ 0.72, δCe 0.85 ~ 0.90, Eu slight loss. REE distribution patterns show oblique to the HREE side and enrichment in LREE. Shishan Layer also is characteristic as being rich of SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, TiO<sub>2</sub>, and being concentration of Zn, Cd, Ag, Bi, Pb and so on, also concentrated with LREE, which is showed the Eu slight loss.

The F<sub>10</sub> fault mineralization element combination is Zn-Cd-Ag-Bi-Tl-Pb-Mo-Co, which is consistent basically with Shishan Layer. It instructed the F<sub>10</sub> fault is the ore-transmitting structure. The mineralization material mainly comes from the Shishan Layer. The dolomite does not provide the mineral substance, is just only occurrence ore body. It shows spatial relations, but non-origin relation, This offered the base for the prognosis of deep ore prospecting.

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## Contemporary geo-space use and environment improvement

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As the urban gradually expansion, the urban environment deteriorat year by year. Excessive vehicles cause air pollution, traffic blockage, and extremelly lack of parking facilities in city centre. As the population gradually increasing, the urban temperature increase and moisture descend annually, which caused the thermal island and dast arch. The infrastructure about liquid natural gas supply, sewage system, electrical supply, heat supply and waste disposal also cause many problems to the geo-space urban environment. To settle these problems, geo-space urban design and use is a feasible plan.

For protecting urban environment, many contry started to exploit the underground space, such as Canada, Sweden, U.S, France, Japan and China. Contemporay underground utilization generally distributed in three zones: shallow depth zone, medium depth zone and deep zone. Subway, underground roadways, distribution systems and other transportation systems, parking facilities, entertainment facilities and shopping centres mainly builtd in shallow depth zone; defense system, automated production system, enegy tanks and other infrastructures mainly builtd in medium or deep zone.

Geo-space urban design considerations are about hazards and safety, health, altitude, climate, soil thermal performance, land-use policy, and so on.

The underground utilization is becoming a new and stable develop international trend. Compared with traditional overground structure, underground struture cost more in early stage. But with more experience, large scale development and technic advance, the overground and underground building price will be fair finally. Then, the ground surface green space will increase, vehicles and air pollution will decrease, and geo-space urban environment will improve greatly.