Geology characteristics of Fanshan alunite deposit in Lujiang-Zongyang continental volcanic basin in Eastern China

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The Lu-Zong basin (Lujiang-Zongyang) is one of the most important Mesozoic continental volcanic basins in the Middle and Lower Reaches of Yangtze Metallogenic belt, eastern China. The basin comprises four shoshonitic volcanic rocks and corresponding intrusions. Fanshan deposit is one typical high-sulfidation alunite deposit in the Lu-Zong basin. The wall rock of the deposit includes Lower Cretaceous Zhuanqiao formation andesite, trachyte and volcanic tuff etc., and the main ore-control structure is monoclinal structure. The alteration zoning of the deposit is obvious and can be divided into silication zone, silication-pyritization-alunitization zone, kaolinization-alunitization zone and sericitization-chloritization zone from deep part to superficial part. The sections where alunitization are intensively developed are ore bodies. The deposit yields two type ores that are alunite-pyrite ore and alunite-kaolinite ores, separately.

In Zhuanqiao formation, intense volcanic eruption produced large amount of the acidic ore-forming fluids which are enriched in H_2S and SO_4^{2-}. The ore-forming fluids reacted with andesitic and tuffaceous volcanic strata in rising process. After the alteration of feldspar minerals (including felsic vitric fragment and volcanic ash etc.), Al and K etc. ore-forming elements were separated out and combined with SO_4^{2-} in ore-forming fluids to form alunite, and iron-bearing minerals reacted with H_2S minerals to form pyrite. Along with continuous moving up of gas and liquid, SO_4^{2-} content in the in ore-forming fluids diminished unceasingly and formed alunite-kaolinite mineral assembly. While ore-forming fluid's acidity declined, minerals such as sericite and chlorite had appeared to form alteration zoning of ore-forming fluid system.

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Thermal evolution characteristics of Permian source rocks in Yongmei basin, China

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Many authors have reported that thermal evolution of organic matters in Volcanic –magmatic areas are generally high, which are normally controlled by magmatic process.

The result of this study shows that samples from Yongmei basin have relatively high vitrinite reflectance (Ro)values (above3%). Ro values vary from 4-5% in the northwestern part of Yongmei, whereas 5-6% in the southeastern part. In a study of 4 coal wells from Yongmei basin, We observed that Ro values increase along with depth roughly, however, the correlation coefficient between Ro and depth is 0.31, indicating that burial is not the dominant factor on thermal evolution. Permian strata is characterized with illite crystallinity values from 2.5 to 4.2°($\Delta 2\theta$). A one- dimensional analysis of burial history and thermal evolution was carried out in 3 wells in Yongmei basin with the aid of one-dimensional nonsteady numerical reconstructions. In the course of this thermal history, we believe hydrocarbons were generated as follows: Permian source rocks are in high maturity, entered threshold of oil generation during Early Triassic time, maximal paleogeotemperature up to 400 °C during Early Cretaceous time. There was no significant modification of hydrocarbon maturation history from Late Cretaceous to the Present.

The conclusion shows organic maturation of Permian source rocks increases from northwest to southeast, so does magmatism scale. Permian strata lies in very low-grade metamorphic stage. The main factors responsible for heating the area are an elevated basal heat flow resulting from lithosphere thinning and widespread intrusive-thermal activity during Early Cretaceous time.