

## The geochemistry identifier of ore-type and non-ore-type diapir in Yimen Fengshan copper deposit

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Yimen Fengshan copper deposit is a typical example of copper deposit which controlled by diapir structure in Yimen rifted-basin of the Kunyang rift valley, Yunnan Province, China. Ore bodies are located in cataclastic dolomite of Lvzhijiang formation. Studies suggest that not all diapir are controlling ore bodies, and diapir are divided into ore-type and non-ore-type. By contrasting the petrography and geochemistry characteristics, the paper established the identification marks of the two type diapir which play an important role in the depth ore-finding prognosis.

There are four identification marks: (1) the ore-type diapir rock composition and pre-tectonic recrystallization are complexity than the non-ore-type diapir, the ore-type diapir rock is cryptoexplosion which mainly made up of intermediate-acid crystal tuff breccias and dacite breccias. But the non-ore-type diapir rock are tuffite and sericite slate. There is a more bigger alteration zone (100-200m) around ore-type diapir than non-ore-type diapir's (5-10m). The alteration mainly composed of silicification and pyritization, ore-type diapir fluid temperature are 180-320°C [1]. (2) The ore-type diapir with the geochemistry characteristics of that variation in MgO content (3.18% - 15.64%), FeO/Fe<sub>2</sub>O<sub>3</sub> value range is big (0.43 - 28.50%), Na<sub>2</sub>O content (0.10 - 7.13%) high, K<sub>2</sub>O content is low (0.11 - 2.98%), instead of the non-ore-type diapir MgO content is low (1.90% - 3.77%), FeO/Fe<sub>2</sub>O<sub>3</sub> value is also low (0.14 - 0.56), Na<sub>2</sub>O content is low (0.07 - 2.83%), K<sub>2</sub>O content is high (1.84 - 5.11%). (3) The zoning characteristic of metal mineral association and structure of ores from ore-type diapir to adjacent rock is that massive and veined chalcopyrite (a small amount of bornite)→veined and disseminated chalcopyrite, bornite (a small amount of chalcocite)→Scattered punctuate and small vein chalcopyrite, bornite and chalcocite, but the non-ore-type diapir have lowly mineralization.

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[1] Han R S, Liu C Q & Sun K X *et al.* (2000) *Geotectonica et Metallogenia* 2, 146-154.

## The paleosalinity for lacustrine massive source rocks deposition during the Upper Cretaceous in Songliao Basin China

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Methylated-2-methyltrimethyltride-cylchromans (MTTCs) is a salinity indicating biomarkers that are widely detected in modern and ancient sediments and crude oil. The composition and distribution of methylated-MTTCs identified in Late Cretaceous core samples of Nenjiang Formation (K<sub>2</sub>n<sup>1</sup> and K<sub>2</sub>n<sup>2</sup>) of SK-1 drilling from Songliao Basin are suggestive of the paleosalinity of depositional environments and redox state, while bearing no relation with organic matter types, burial depth and maturity. Among these MTTCs, δ-MTTC is abundant in high salinity reducing environment but absent in the low salinity aerobic environment; while γ-MTTC shows a relative higher abundance in the high salinity environment than that of lower saline environment; furthermore, relative abundance of two dimethyl-MTTCs display a relation of γ>β in higher-salinity environment, but γ<β in lower salinity environment; after all α-MTTC is a non-salinity dependent compound and rich in all environments. This study also suggests that α-MTTC/γ-MTTC (α / γ) ratio is also indicative of paleosalinity as a α / γ ratio of less than 2 indicates a mesosalinity environment, while a ratio of greater than 15 is indicative of a semi-saline to brackish lacustrine environments, a ratio between 2 and 15 is indicative of normal marine-like salinity. The combination of all related molecular marker index suggest that K<sub>2</sub>n<sup>1</sup> and K<sub>2</sub>n<sup>2</sup> were formed under significantly different salinity, as the organic rich source rocks of K<sub>2</sub>n<sup>1</sup> section were deposited under a normal marine-like salinity prevail occurred at the top section; while K<sub>2</sub>n<sup>2</sup> were likely developed under a semi-saline to brackish lacustrine environments under a relative stable salinity.

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