Organic geochemistry of deep carbonate rocks in the Tarim Basin

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Tarim Basin cores of a deep Cambrian carbonate rocks from depth of 4000 to 7124 m in the Tacan 1 well were collected, and their molecular and carbon isotopic compositions of individual hydrocarbons in free organic matter and inclusion organic matter were investigated. Some commonly applied biomarker thermal maturity parameters show different change trend at high level thermal maturity. Ts/Tm for C_{27} hopanes and 20S/20S+20R for C_{29} steranes in free organic matter still can be used to estimate the maturity of source-rock extracts at vitrinite reflectance (Ro) values of 1.0□1.3%, while tricyclics/hopanes ratio is an effective maturity parameter from 1.0 to 2.26%Ro, but C_{29} steranes □□/□□+□□ cannot be applied to indicate maturity stage because of a reversal trend above 1.1%Ro. Although there are higher temperatures at depth in this well, many biomarker thermal maturity parameters do not reach their equilibrium values due to overpressure retardation.

There are obviously different molecular compositions between two existing states in deep carbonate rocks. Free organic matter contain more hydrocarbons and richer in tricyclic trepanes compared with inclusion organic matter at the same samples, and n-alkanes in free organic matter has unimodal distribution than bimodal characteristic in the inclusion organic matter, Pr/Ph and C_{29} steranes 20S/20S+20R parameters in free organic matter are higher than inclusion organic matter. However, n-alkanes and isoalkanes of the same carbon number have similar carbon isotopic values between two different existence states at the same sample; this maybe suggests that organic matter of two existence states have a similar source, whereas their molecular composition differences are probably due to various thermal maturity and catalysis during late geological processes.

This work was supported partly by the Chinese National Major Fundamental Research Developing Project (2006CB202305) and the Important Direction Projects of Knowledge Innovation, the Chinese Academy of Sciences (KZCX3-SW-147) and the Chinese National Natural Science Foundation (40572088).

Multitypes of ore-forming fluid systems in the Mesozoic polymetallic middle and lower reaches of the Yangtze River area mineralization belt, china

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There are many types of Cu-Fe-Au-Pb-Zn-U mineralizations in Middle and Lower Reaches of the Yangtze River Area mineralization belt, China. Five types of Mesozoic ore-forming fluid systems are recognized which include: (1) skarn-porphyry-stratabound Cu-Fe-Au system which relate to the high potassium calc-alkaline dioritic intrusions and formed between 145-137Ma [1] mostly in the fault uplift areas like Tongling and Jiurui areas; (2) Porphyritic or IOCG Fe system relate to shoshonitic sub-volcanic rocks and formed between 135-127Ma in fault basins such as the Ningwu and Luzong areas; (3) hydrothermal Cu-Pb-Zn-Ag and U-Au systems related to alkaline/Atype granitic intrusions formed during 129-123Ma mainly developed in the volcanic basins; (4) HS alunite-Cu-Au(?) system related shoshonitic volcanic rocks formed between 133-130Ma mostly in the Luzong volcanic basins; and (5) Epithermal Tl-Au system related to Ordovician exhalative deposition and the late Cretaceous (131Ma) hydrothermal activity in the out zone of this belt [2].

These ore-forming systems were formed in a complex Mesozoic inland continental geodynamic backgrounds confined by the North China Block, the South China Block and properly the paleo-Pacific plate in which the crust-mantle interaction had played an important role.

This research was sponsored by the National Key Basic Science Research Project of China (2007CB411405), China NSFC project (40772057), SRFDP (20050359013) and the CODES scientific research project, UTAS, Australia.

[1] Zhou *et al*. (2006) *Ore Geology Reviews* **29**, 307-324.
[2] Zhou *et al*. (2005) *Mineralogy and Petrology* **85**, 243-251.