

## The compositions of gas and origin from serpentized peridotite in the Wenduermiao in Inner Mongolia

ZHANG MINGFENG<sup>1</sup>, ZHUO SHENGUANG<sup>2</sup>, WANG XIANBIN<sup>1</sup>, TUO JINCAI<sup>1</sup>, WU CHENJUN<sup>1</sup>

<sup>1</sup>[Key Laboratory of Petroleum Resources, Gansu Province Northwest Institute of Eco-Environment and Resources, Chinese Academy of Sciences, Lanzhou, 730000. e-mail: zhangmf@lzb.ac.cn]

<sup>2</sup>[The School of Resource and Material, Northeastern University at Qinhuangdao, Qinhuangdao 066000, China]

Serpentinization may be the driving force of hydrothermal system and can produce methane and hydrogen, the molecular hydrogen formed may be used as an energy and electrons source by microbial communities. Study serpentization gas, which provide the evidence of abiotic methane formation, also has favorable organic compound synthesis condition, and by studying the serpentization ultrabasic rock system to explore the origins of life on earth. The chemical and carbon isotopic compositions of gas from serpentized peridotite in the Wenduermiao in Inner Mongolia have been determined by stepwise heating mass spectrometer to reveal gas sources. The results showed that CO<sub>2</sub> as the dominant component with N<sub>2</sub>、H<sub>2</sub> and CH<sub>4</sub>-C<sub>2</sub>H<sub>6</sub> (400 °C-600 °C) as major ones in the gas of the Wenduermiao serpentized peridotite.

The δ<sup>13</sup>C values of CO<sub>2</sub> were in ranges between -18.6~2.6‰ and the δ<sup>13</sup>C values of CH<sub>4</sub> were -8.1~-51.8‰. The δ<sup>13</sup>C values of CH<sub>4</sub>、C<sub>2</sub>H<sub>6</sub>、C<sub>3</sub>H<sub>8</sub> and C<sub>4</sub>H<sub>10</sub> show inverse carbon isotopic trend, a normal carbon isotopic distribution pattern among CH<sub>4</sub> to C<sub>4</sub>H<sub>10</sub> with partial reversal, which show the δ<sup>13</sup>C feature of abiotic and biotic origin. Organic compounds in serpentized peridotite may have two sources from the Wenduermiao in Inner Mongolia. One is Abiogenic organic compounds which may be generated through the FTT type reaction under reducing and high hydrogen concentration condition during serpentization. Other is biogenic organic compounds which may originate from Thermal degradation of oceanic organic matter and microbial activity.