

## The demethylation of light alkyl aromatics and its effect on the gas generation from coal in the high and over maturity

HU GUOYI<sup>1,2</sup>, ZHANG SHUICHANG<sup>1,2</sup>, MI JINGKU<sup>1,2</sup>,

<sup>1</sup> Research Institute of Petroleum Exploration & Development, PetroChina. Beijing China 100083,

Huguoyi69@petrochina.com.cn

<sup>2</sup> Key Laboratory of Petroleum Geochemistry, CNPC. Beijing, China 100083

The amount of alkyl light aromatics among the gasoline generated from coal in the stage of mature and high mature is very high. The secondary cracking of alkyl aromatics can contribute to the natural gas accumulation in high maturity reservoirs and the carbon isotopic signatures of methane and ethane cracked from alkyl light aromatics (for example, toluene) were evaluated in this text..

The content of benzene and toluene among the C<sub>6</sub>-C<sub>7</sub> light hydrocarbon of 125 gases generated from the different mature coals have been analysed by GC. The pyrolysis gas chromatography(Py-GC). With increasing maturity, the alkanes and cycloalkanes are declining significantly, while the benzene to C<sub>7</sub>-alkane ratios are increasing. In addition, the benzene to toluene ratios are increasing too, indicating continuous demethylation of toluene with maturity.

Cracking of light alkyl aromatics would contribute to the gas inventory and would affect the isotope values of the hydrocarbon gases. Py-GC-IR-MS have been applied to quantify benzene and toluene pyrolysed from coal in the different temperatures and carbon isotopes were also determined. Benzene and toluene carbon isotopes in gases sampled in the different gas fields have been also measured. The result show that the carbon isotope of toluene is lighter than that of benzene. It is supposed that methyl in the toluene is enriched <sup>12</sup>CH<sub>3</sub>, and the demethylation of light alkyl aromatics has greatly effected on the methane and ethane isotope, for example, the ethane isotope rollover.