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LATE-GENERATED BIOGENIC GASES IN THE BOHAI GULF BASINS, EASTERN CHINA

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There are some natural gases in good relation with microbe in the Eogene of the Bohai gulf basins. Most of them are produced from burial depth less than 2000 m. Gases are composed of mainly methane (98%) and trace C_{2+} and non-hydrocarbon gases (such as N_2, CO_2 and H_2S). The stable carbon isotope composition of methane is relatively wide, ranging from -45‰ to -60.7‰ (PDB).

Unlike biogenic gases early-generated during soon after deposition of reservoir and source rocks, all the gases should have been late-generated after a time interval separate deposition of reservoir and source rocks and gas generation (Shurr and Ridgley, 2002). The reasons lie in two parts: the geological distribution of those gases and the deposition conditions of Eogene. Firstly, most microbial gases are distributed at the tectonic active regions as the edge and central fracture belts of the basins. In those regions, groundwater recharge strongly. It is clearly shown that groundwater produced with biogenic gases is always $NaHCO_3$ type, while that in regions without biogenic gases is always NaCl type. That means the formation of microbial gases must be in good relationship with active water circulation which could make the circumstance appropriate for microbe action. Secondly, the Neogene deposited in a warm brackish water environment where microbial is enjoyed and eugonic soon after sediment buried. Therefore, transitional organic matter should be easily consumed and transformed to early-generation biogenic gases. With transitional matter decreasing, the activation of microbial turned to be weaker and weaker till biogenic gases generation ceased at the end. Early-generated biogenic gases formed at a burial depth so shallow that they must have escaped to air totally.

Until tectogenetic movement giving birth to fractures, the sediments could be connected with the outer through groundwater, which induce microbe reactivated and

biogenic gas generated again. In such condition, only rocks rich in organic matter could be the feasible source for microbial gases.

REFERENCE

Shurr G W, Ridgley J L. (2002) Unconventional shallow biogenic gas systems. *AAPG* **86**, 1939-1970.