

Natural Gas Genetic types in the Western Part of Qaidam Basin, NW China

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There are abundant petroleum resources present in the western part of the Qaidam Basin. Natural gases occurred in different structures have been collected and analyzed for their origins. Based on chemical composition and carbon and hydrogen isotopic values of natural gases, natural gases can be divided into four types. Most gases associated with oil are derived from thermogenic gases. Gases in west Yingxiongling (YXL) and Yaojing structural belt are typical oil-derived alkane gases with $\delta^{13}\text{C}_1$ ranging from -40‰ to -46‰ and $\delta^{13}\text{C}_2$ values range from -28‰ to -35‰. Lower Ganchaigou saline lacustrine environment mudstone located in Hongshi Sag are regarded as main source rocks for these natural gases.

Natural gases in the Kaite, Nanyishan and Wunan-zhahaquan have different geochemical characteristics, and their $\delta^{13}\text{C}_2$ values range from -25.0‰ to -27.7‰. It maybe show that gases in these area main coal-derived gases are sourced from Middle and Lower Jurassic source rocks. Gases in and Gasi, Middle and East YXL structural belt are oil-derived gas, but their mature are higher than west YXL. Other gases in the shallow strata of Gasi and Xianshuiquan are suffered from microbial degradation.

$\delta\text{D}_{\text{CH}_4}$ and $\delta\text{D}_{\text{C}_2\text{H}_6}$ of natural gases from different structure have obviously positive relationship, coal-derived gases have heavier hydrogen isotope, while as oil-derived gases have lighter hydrogen isotope signatures, which probably showed that hydrogen isotopic values of gases is related with organic types, and salinity have no obviously influences in these areas.

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