

Identification index of different types of oil cracking gas and its application

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Oil cracking gas is an important type of gas in high-over mature petroleum basins. Oil cracking gas includes accumulated oil cracking gas and dispersed liquid hydrocarbon cracking gas. Accumulated oil cracking gas is the gas cracked from oil accumulated in paleotrap. Dispersed liquid hydrocarbon cracking gas refers to the gas cracked from dispersed liquid hydrocarbon which was retained in source rock, reservoir rock and migration pathway. The identification indexes, used to differentiate humic gas and oil-type gas, are not applicable for different types of oil cracking gas. Finding proper identification indexes for different types of oil cracking gas can be useful to oil cracking gas exploration and supplementation and perfection of genetic identification methods of gas.

This study used Gold tube closed system simulation experiment. Pressure was set at 50MPa. Simulated temperature are 370°C, 385°C, 415°C, 430°C, 445°C, 460°C, 475°C and 490°C. Crude oil and carbonate mineral were mixed at different ratio (4:1, 1:1 and 3:7) to simulate accumulated oil cracking process. Crude oil and clay mineral (Montmorillonite) were mixed at different ratio (1:19, 1:49 and 1:99) to simulate dispersed oil cracking process. Oil cracking gas compositions at the seven temperatures were measured. The study indicates that $\Sigma C_6 \sim C_7$ Cycloalkanes / (nC₆+nC₇) and Methyl Cyclohexane / nC₇ are effective indexes to identify the accumulated oil cracking gas and dispersed liquid hydrocarbon cracking gas. Gas from Dengying formation of Sinian strata in Gaoshiti-Moxi, Longwangmiao formation of Cambrian strata and Cambrian-Silurian strata in Weiyuan is accumulated oil cracking gas according to $\Sigma C_6 \sim C_7$ Cycloalkanes / (nC₆+nC₇) and Methyl Cyclohexane / nC₇. The conclusion is consistent with the geological background and backed by distribution property of solid bitumen in reservoir rock and other proof.