Application of Organic Inclusion in Research of Oil-Gas Migration and Filling Periods of Fuyang Reservoir in Northern Songliao Basin

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This project studies geochemical distribution scope of effective hydrocarbon source rock in Fuyu-Yandachengzi reservoirs through source rock geochemical features and reservoir relation. It performs correlation of oil geochemical characteristics of Fuyu-Yandachengzi reservoirs in different areas, classifies oil families and studies hydrocarbon migration characteristics using absolute quantitative features of nitrogenous compound in oil. It studies reservoir forming time and stages of Fuyu-Yandachengzi reservoirs using authigenetic illite K-Ar method and isotope method age dating and fluid inclusion homogenization temperature measurement, and combining regional burial history. This provides date parameters for study on hydrocarbon filling and migration in Fuyu-Yandachengzi reservoirs. Based on the research result, this project analyzes affecting factors of hydrocarbon migration and reservoir forming combining with geologic characteristics of Fuyu-Yandachengzi reservoirs, proposes the characteristics of “hydrocarbon filling controlled by formation uplifting” in Fuyu-Yandachengzi reservoirs, and indicates that basin evolution is the determinative factor of reservoir forming.

This project proposes the characteristics of “hydrocarbon filling controlled by formation uplifting” in Fuyu-Yandachengzi reservoirs for the first time, and that basin evolution is the determinative factor of reservoir forming. The main reservoir forming stages of Fuyu-Yandachengzi reservoirs is respectively subsiding stage and uplifting and denudation stage, i.e. reservoirs can form in both subsiding stage and uplifting and denudation stage. Reservoir forming stage of North Qijia and Western Slope areas is mainly in subsiding stage, and that of area to the east of Placanticline is mainly in uplifting and denudation stage.

This project introduces analysis on characteristics of biomarker, nitrogenous compound and hydrocarbon bearing fluid inclusion for the first time. It characterizes oil source relation and hydrocarbon migration direction systematically, expanding application field of geochemical research. It performs correlation study on reservoir forming time and stages of Fuyu-Yandachengzi reservoirs in eastern and western areas of the basin, providing date parameters for hydrocarbon filling and migration in the reservoirs.

Reservoir distribution of Fuyu-Yandachengzi reservoirs is controlled by regional effective source rock.