

Modeling of the whole hydrocarbon-generating process of sapropelic source rock

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Abstract: Based on experimental data from hydrocarbon generation with a semi-open system, hydrocarbon generation kinetics modeling in gold tube of closed system, high temperature pyrolysis chromatography mass spectrometry experiment with open system (fig.1) and geological data, the characteristics of whole hydrocarbon-generating process, hydrocarbon expulsion efficiency and retained hydrocarbon quantity, origins of natural gas generated in high-over mature stage and cracking temperature of methane homologs were investigated in this study. The sapropelic source rock has a hydrocarbon expulsion efficiency of 30%~60% and 60%~80% in the major oil generation window (with Ro of 0.8%-1.3%) and high maturity stage (with Ro of 1.3%-2.0%) respectively; and the contribution ratio of kerogen degradation gas to oil cracking gas in total generated gas in high maturity stage is about 1:4. The degradation gas of kerogen accounts for 20%, the retained liquid hydrocarbon cracking gas accounts for 13.5%, and the amount of out-reservoir oil cracking gas (including aggregation type and dispersed oil cracking gas) accounts for 66.5%. The lower limit of gas cracking is determined preliminarily. Based on the new understandings, a model of the whole hydrocarbon-generating process of source rock is built (fig.2).

Key words: sapropelic source rock; hydrocarbon-generating model; hydrocarbon expulsion efficiency; experiment of hydrocarbon generation; kerogen; degradation gas; cracking gas

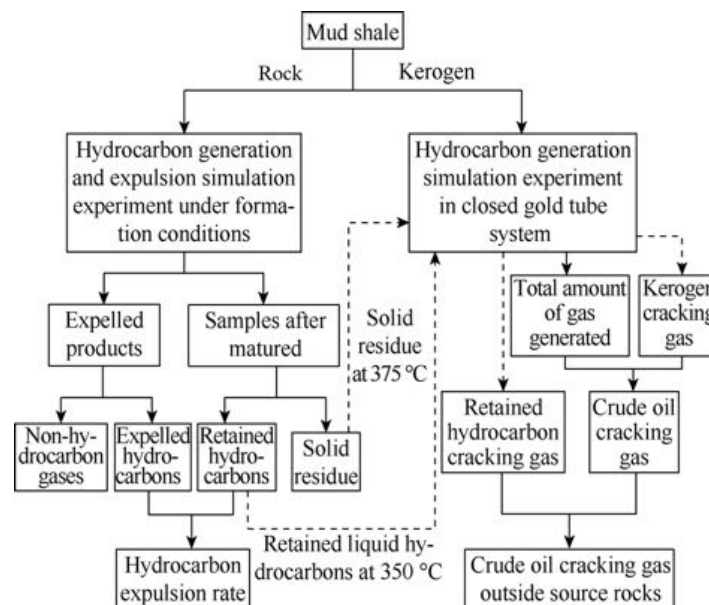


Fig. 1. Experimental research flow

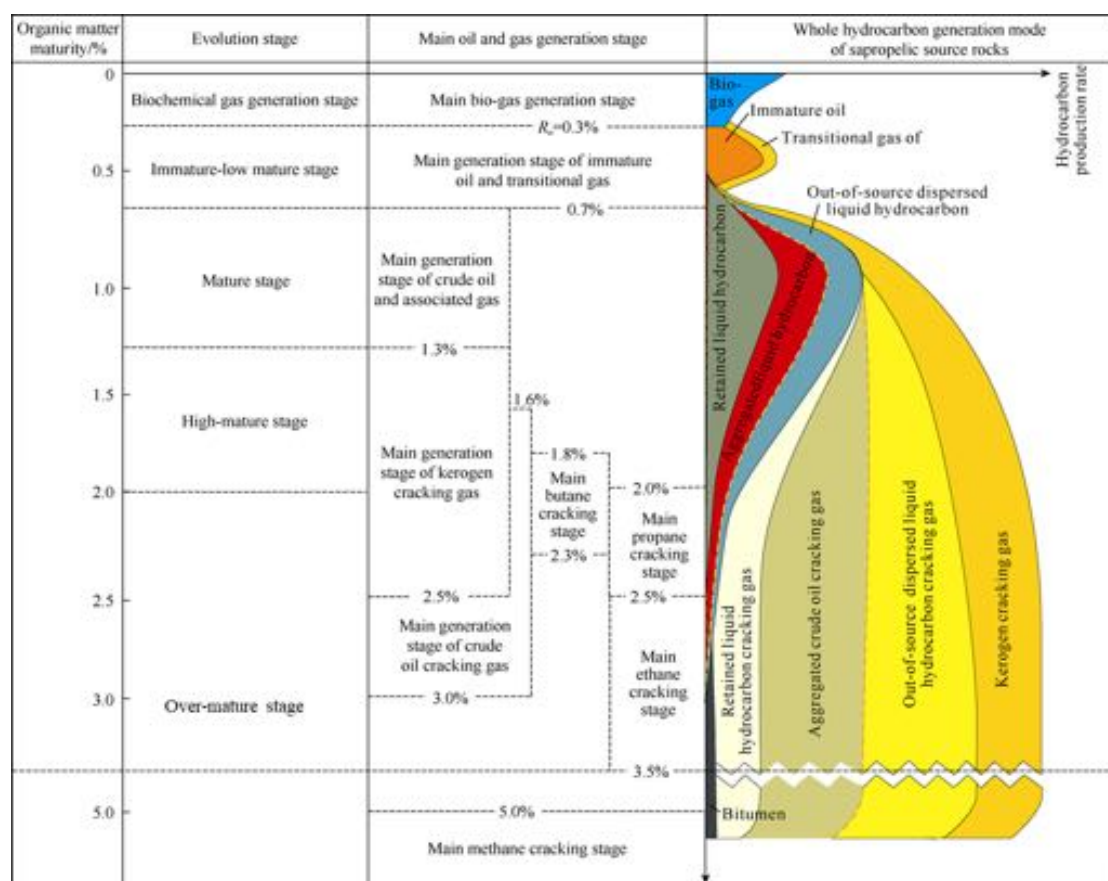


Fig. 2. Whole hydrocarbon-generating process mode of sapropelic source rocks