

Hydrocarbon generation characteristics of lower Es 3 and upper Es 4 member source rocks in Niuzhuang sag of Bohai bay basin, China

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Systematic organic petrology and geochemistry analysis on source rock of lower Es3 and upper Es4 member in Niuzhuang sag has been done and also discussed the generation character of hydrocarbon. The results indicate that the main organic types of the shale and non-gypsum mudstone in lower Es 3 and upper Es 4 member are I - II₁, and the dominated frequency of activation energy ranged at 57~ 60 kcal/mol with a percentage higher than 80%. A similar distribution character decided the similar hydrocarbon generation evolution process of the two source rock. Large amount of samples rock pyrolysis analysis indicate that source rock of upper Es 4 member has no obvious double peak hydrocarbon generation model. The hydrocarbon generation evolution process of the shale and non-gypsum mudstone has no obvious difference. Large part of oil from lower Es 3 and upper Es 4 member started to generate is at the depth about 3100-3200m, the oil generation peak is around 3500m. The activation energy distribution of gypsum mudstone of upper Es 4 member is at a large range, and the lower part has a large proportion, so the oil generation threshold of the gypsum mudstone is shallower than shale and non-gypsum mudstone. Because of lacking enough drilling data of the gypsum mudstone of upper Es 4 member in Niuzhuang sag, more work has to be done to define its oil generation threshold in next research.