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鄂尔多斯盆地吴起—志丹地区长10烃源岩特征与生烃潜力

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Geochemical Characteristics and Hydrocarbon Generation Potentials of Chang 10 Source Rock in Wuqi-Zhidan Area, Ordos Basin □

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摘要/Abstract

摘要:

鄂尔多斯盆地中部志丹—吴起地区延长组长10油层组顶部发育一套湖相暗色泥岩, 确定该套烃源岩的地质地球化学特征及生烃潜力对该区油气勘探有重要意义。利用岩心和测井资料, 研究了长10暗色泥岩的分布特征, 通过开展岩石热解、干酪根显微组分、镜质体反射率、可溶有机质族组分及饱和烃色谱—质谱等有机地球化学测试和分析, 评价了长10烃源岩的生烃潜力。研究表明, 长10暗色泥岩分布广泛, 厚度为5~20m; 烃源岩有机质丰度和生烃转化率较高, 有机质母质中陆源植物生源贡献较大, 主要为II型和III型干酪根, 有机质热演化程度达到成熟生油阶段, 总体评价为较好—好烃源岩。长10烃源岩的生物标志化合物特征有别于长7烃源岩和长9烃源岩, 具有高Pr/Ph值、 $\alpha\alpha\alpha 20R$ 构型 C_{27} □、 C_{28} 和 C_{29} □规则甾烷呈反“L”型分布的典型特征。长10烃源岩的生烃量较大, 是鄂尔多斯盆地中生界另外一套重要的有效烃源岩, 该套烃源岩的发现为鄂尔多斯盆地中部延长组下组合的深入勘探提供了科学依据。

关键词: 长10烃源岩, 地球化学, 生烃潜力, 鄂尔多斯盆地

Abstract:

There is a set of dark lacustrine mudstones in the upper part of Chang 10 beds in Wuqi-Zhidan area, Ordos Basin. Evaluation of the geological and geochemical characteristics and hydrocarbon generation potential of this set of source rocks is very important for the oil/gas exploration in Wuqi-Zhidan area. The authors studied the distribution of Chang 10 bed dark mudstones through core and well log data and evaluated the hydrocarbon generation potential of Chang 10 source rock based on the analyses of rock pyrolysis, micro-composition of kerogen, vitrinite reflectance, group composition of solvable organic matter, GC-MS of saturated hydrocarbon, and so on. The study illustrates that the dark mudstones of Chang 10 bed spread widely and its thickness vary from 5m to 20m. Organic matter abundance and hydrocarbon generation conversion of source rock are high. The terrigenous plants which mainly attribute to type II and type III kerogen contribute enormously in source organic matter. Organic matter reached mature oil generation stage. In conclusion, they were determined to be relatively good-good source rocks. The biomarker compound of Chang 10 source rock bed has high Pr/Ph ratio, opposite "L" type distribution of $\alpha\alpha\alpha 20R$ configuration C_{27} □、 C_{28} and C_{29} □ regular steranes, which differs distinctly from source rocks of Chang 7 and Chang 9 beds. The source rock of Chang 10 bed, whose hydrocarbon generation quantity is large, is another important efficient source rock of Mesozoic Group in Ordos Basin and its discovery provides scientific evidence for further exploration of the bottom layer of Yanchang Formation in midland of Ordos Basin.

Key words: Source rock of Chang 10 bed, Geochemistry, Hydrocarbon generation potential, Ordos Basin

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