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致密油地质研究现状及展望

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Research Status on Tight Oil and Its Prospects

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摘要/Abstract

摘要 :

致密油已成为全球石油地质领域研究的一大热点, 在中国的很多盆地也发现了致密油分布。通过对国内外大量文献资料的调研, 总结致密油的地质研究现状。结果表明致密油聚集条件与常规油藏成藏有明显区别, 可主要概括为3点:①广覆式分布的优质生油层|②大面积分布的致密储集层|③连续型分布的储集层与生油岩紧密接触的共生层系。致密储层孔隙系统主要为微米—纳米孔喉系统, 并以纳米级孔喉为主。致密油聚集需要强大的源储剩余压差以克服纳米孔喉系统形成的强大的毛细管阻力。致密油聚集以初次运移为主, 只发生短距离二次运移, 这种运移具有非达西流特征。目前对致密油的充注、运移和聚集的研究还不够深入, 致密储层非均质性及源储压差演化等因素对致密油聚集的影响尚未被揭示, 这些问题都需要进一步深入探讨。对今后致密油的研究, 建议关注致密储层微观孔喉结构分布的非均质性及对石油聚集的有效性、石油充注机理及储层非均质性与致密油富集的耦合关系等科学问题。

关键词: 致密油, 聚集条件, 致密储层特征, 聚集机理, 存在问题, 展望

Abstract:

Tight oil has become a hot topic in the field of global petroleum geology research. A lot of tight oils have been found in the Chinese basins. Current exploration of tight oil was summarized based on a large number of research literature. The accumulation condition of tight oil is very different from conventional oil, which can mainly be summarized in three aspects: (1) high quality source rock with moderate maturation and wide distribution; (2) wide distribution of tight reservoir. (3) coexistence of source rock and reservoir. Pore systems of tight oil reservoir are mainly microns-nanometer, and dominated by nanoscale pore throat. Tight oil reservoir requires a powerful remaining pressure difference between source rock and reservoir to overcome the capillary resistance caused by nanopores. Tight oil is dominated by primary migration and sometimes has secondary migration with short distance, which has non-Darcy flow characteristics. The charging, migration and accumulation of tight oil have not been studied very well currently. Tight oil reservoir heterogeneity and the evolution of source and reservoir pressure difference effect on the tight oil accumulation have not been revealed. All these issues need to be further studied. Future research should focus on the heterogeneity of tight oil micro-pore structure and its effectiveness on oil accumulation, oil charging mechanism, and the coupling relationship between reservoir heterogeneity and oil accumulation.

Key words: Tight oil, Hydrocarbon accumulation conditions, Tight reservoir characteristics, Accumulation mechanism, Problems, Prospects

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