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准北缘哈山斜坡带侏罗系原油稠化机理及充注特征

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Formation Mechanism and Hydrocarbon Charging of Jurassic Reservoirs in Hashan Area Northern Sloping Zone of Junggar Basin

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PDF (PC)

130

摘要/Abstract

摘要 :

近年来,在准噶尔盆地北缘哈山地区的油气勘探取得重大突破,发现了春晖油田和阿拉德油田,目前已在侏罗系八道湾组和西山窑组上报探明稠油地质储量超过5850×10⁴t。利用研究区原油地球化学指标、储层流体包裹体产状、显微荧光特征及均一温度分析,结合烃源岩埋藏生烃史研究,明确了侏罗系原油的稠化成因机理和充注成藏演化过程。侏罗系原油主要来自玛湖凹陷风城组烃源岩,其在运移过程中随运移距离的增加,埋藏变浅,轻质组分散失,受生物降解作用、氧化作用和水洗作用等综合作用影响不断稠化,成藏之后由于保存条件较差再次稠化,属以生物降解作用为主的次生型稠油。从原油成熟度差异及地球化学叠合属性特征分析,侏罗系油藏存在2期烃类充注过程,第一期为晚侏罗世,第二期为晚白垩世,且以第一期充注为主。在此基础上,建立了1期充注和2期充注2种油气成藏演化模式,为研究区有利稠油油藏分布预测提供了理论依据。

关键词: 稠油, 成因机制, 地球化学特征, 充注期次, 成藏模式, 侏罗系, 超剥带, 哈山地区

Abstract:

In recent years, Chunhui and Alade Oilfields are the significant breakthroughs of hydrocarbon exploration in the northern margin of the Hashan area, Junggar Basin. At present, it has proved geological reserves more than 5 850×10⁴t in the Badaowan Formation and Xishanyao Formation. Through analysis of the geochemical crude oils, the occurrence, the microfluorometry characteristics and homogenization temperature of fluid inclusions, as well as the analysis of burial and hydrocarbon generation history of the source rocks, the origin and formation mechanism of heavy oil and the process of hydrocarbon accumulation are defined. The Jurassic crude oil is mainly originated from the Fengcheng Formation source rocks of Mahu Depression. As the migrating distance increases, and the light hydrocarbon escapes, the oil charges gradually change by migration from normal oil into complete heavy oil with the burial depth becoming shallower. It is considered that the heavy oil is mainly of secondary origin. The alteration of heavy oil would be divided into biodegradation, oxidation and water washing, of which the biodegradation is the most important. Based on the systematic analyses of the different maturity and geochemical characteristics of crude oil, it's considered that there were two stages of hydrocarbon charges, i.e., the first charging period occurred in Late Jurassic, which is the dominant hydrocarbon charging period, and the later hydrocarbon charging occurred in Late Cretaceous. The hydrocarbon accumulation models are established, including one-stage charge and two-stage charge, which provides theoretical basis for the prediction the distribution of heavy oil in Hashan area.

Key words: Heavy oil, Genetic mechanism, Geochemical characteristics, Charge phase, Accumulation model, Jurassic, Overlap zone, Hashan area

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