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辽河盆地西部凹陷原油的生物标志物类型及其地球化学意义

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摘要:原油的生物标志物组合特征可提供油气来源、成熟度、次生改造程度等多方面的信息,是油气成因分析和油源对比的有效工具.利用原油的生物标志物类型及其组合特征分析地球化学意义,通过生物降解作用的研究和原油生物标志物组合的判断,对稠油的来源进行成因分析,研究认为:辽河盆地不同地区各类生物标志物的组合及正构烷烃和异戊间二烯的分布特征,反映研究区发育母质输入、成熟度和生物降解程度明显不同的两种类型的原油,即富4-甲基甾烷型和富伽马蜡烷型原油,分别来源于沙三段和沙四段源岩.

关键词:辽河盆地;生物标志物;生物降解作用;油源对比;地球化学;石油地质.

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Biomarker Types and Geochemical Significance of Crude Oils in Western Depression, Liaohe Basin

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Abstract: Based on the research of biomarker combined characteristics, oil and gas source, maturity and degree of secondary reconstruction could be discussed which is the effective method to analyses hydrocarbon origin, genesis of petroleum and oil-source correlation. By making the most of biomarker types and combined characteristics, the geochemical significance will be researched. Oil-source correlation had been studied by bacteria degradation and biomarker combined characteristics. The distribution of *n*-alkanes and isoprene shows that various types of crude oil are developed. That is, two main quite different crude oils are developed which are rich in 4-methylstane and rich in gamma-waxy in the study area. The two different crude oils come from Sha 3 and Sha 4 respectively.

Key words: Liaohe basin; biomarker; oil-source correlation; bacteria degradation; geochemistry; petroleum geology.

1 地质背景

辽河盆地位于辽宁省中南部,是渤海湾裂谷盆地中的一个多旋回箕状断陷,其前第三纪基底结构

较为复杂,主要控制性断裂呈北东向展布,形成隆凹相间的构造格局.研究区主要发育7个次级构造单元,即沈北凹陷、大明屯凹陷、西部凸起、西部凹陷、中央凸起、东部凹陷和东部凸起,新生代沉积的地层为房身泡组、沙河街组、东营组和上第三系的馆陶组

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