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煤系烃源岩不同极性溶剂抽提物生物标志物特征 [点此下载全文](#)

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摘要:

煤的氯仿抽提物族组成和生物标志物分布特征与煤系原油存在很大差别, 导致含煤沉积盆地中煤系原油的油源确认十分困难。采用正己烷、苯、二氯甲烷、氯仿4种不同极性溶剂对9个煤系烃源岩和3个典型湖相烃源岩的抽提实验表明, 随着溶剂极性的增加, 抽提物的含量逐渐增加, 其中饱和烃所占的比例明显逐渐减少, 正己烷抽提物的组成与煤成油的组成最相似。尽管不同溶剂获得的抽提物的量和组成存在明显差异, 但是其正构烷烃、类异戊二烯烷烃和甾萜类生物标志物分布特征总体上比较相似, 没有显示出某一种溶剂抽提物中某种烃类的明显富集或者减少。正己烷和氯仿抽提物中生物标志物绝对含量(浓度)分析表明, 正己烷抽提物中生物标志物的绝对含量相对较低, 而氯仿抽提物中相对较高, 煤系源岩之间的差异较大, 而湖相泥岩之间差异较小。10个烃源岩样品的正己烷抽提物和氯仿抽提物中18种主要生物标志物相对含量的统计分析显示, 同一标志物之间相对误差小于5%(包括实验分析误差在内)的占84%, 相对误差大于10%的不足5%。这一结果表明抽提溶剂的极性差异可以导致煤的抽提物中饱和烃相对含量与生物标志物绝对含量的变化, 但是在通常使用的抽提溶剂极限范围内, 不会导致抽提物中生物标志物分布特征和相互比值的变化。从而也不会影响应用生物标志物进行油源对比的结果。使用常规溶剂氯仿抽提煤等高有机质丰度烃源岩所获得的生物标志物可应用于煤系含油气盆地的油源对比。

关键词: [煤系](#) [烃源岩](#) [溶剂极性](#) [抽提物](#) [生物标志物](#)

Biomarker Characteristics of Extracts from Source Rocks in Coal Measures with Different Polarity Solvents [Download Fulltext](#)

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Abstract:

There is a great difference in the gross composition and biomarker distribution between chloroform extracts of coal and oil from coal measures, which results in a difficulty in oil-source correlation in a coal-bearing petroliferous basin. An experiment extracting 9 coal-bearing source rocks and 3 lacustrine source rocks with four different polarity solvents, hexane, benzene, dichloromethane, chloroform, shows that, with the increase of polarity of solvents, the content of extracts increases, and the relative content of saturated hydrocarbon in the extracts decreases. The chemical composition of the hexane extracts is the most similar to that of oils from coal measure basins in the four kinds of solvent extracts. Although there are great differences in content and chemical composition among the four extracts, the distribution pattern of normal hydrocarbons and isoprenoids have little changes. A comparison indicates that the absolute concentration of biomarkers of sterane and terpane in the hexane extracts is relatively lower than that in the chloroform extracts, and the difference of biomarker concentration between the two extracts of coal-bearing source rocks is greater than that between the two extracts of lacustrine source rocks, but the components and distribution characteristics of biomarkers in the two extracts of a source rock are essentially similar within the polarity range of ordinarily used solvents. Based on the statistics of 18 kinds of biomarker in each extracts from 10 source rocks containing different content of organic matter, the percentage exceeds 84%, whose relative error of a compound between hexane extracts and chloroform extracts (including analytical error) is less than 5%, and the percentage is less than 5%, whose relative error is greater than 10%. This result indicates that polarity of solvents controls the relative content of saturated hydrocarbon and absolute concentration of biomarkers in coal extracts, but cannot change component and distribution pattern of biomarkers in coal extracts. So, the difference in gross composition and content of saturated hydrocarbon between hexane extracts and chloroform extracts does not influence the application of biomarkers to correlating oil and source. The biomarkers in extracts obtained by chloroform as an ordinarily used solvent to extract organic-rich source rocks, such as coal and carbonaceous shale, can be applied to the oil-source correlation in coal-bearing petroliferous basins.

Keywords: [coal measures](#) [source rock](#) [polarity of solvent](#) [extracts](#) [biomarker](#)

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