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页岩储层含气性评价及影响因素分析——以长宁—威远国家级试验区为例

Evaluation of Gas-bearing Property for Shale Reservoir and Its Influence Factors Analysis:Taking Changning-Weiyuan National Experimental Zone as an Example

摘要/Abstract

摘要：

页岩储层含气性评价及影响因素分析是对页岩气井进行科学管理、提高页岩气田开发效果的一项重要研究工作。依据长宁—威远国家级页岩气试验区实际资料，建立了一套直接利用特征属性参数数据定量的进行页岩储层含气性评价及页岩含气量的影响因素分析的技术方法，实现了多口井多个层位的气层自动划分和影响因素的定量分析。采用聚合聚类法和多组判别法，把页岩气层划分为Ⅰ类、Ⅱ类和Ⅲ类，对这3个类别的气层建立了判别函数，并利用多元统计复相关原理进行了影响因素分析。分析认为：Ⅰ类气层属于基质性页岩气层，Ⅱ类气层属于裂缝比较发育性气层，Ⅲ类气层属于裂缝一般发育性气层，判别函数可对新未知类型页岩气层自动进行识别。影响页岩含气量的最主要因素包括游离气含量、孔隙度、有机碳含量、渗透率和吸附气含量，而脆性矿物含量、埋深和厚度对页岩含气量有比较小的影响。

关键词: 页岩气, 含气性评价, 裂缝性气层, 有机碳含量, 影响因素

Abstract:

Evaluation of gas-bearing property for shale reservoir and its influence factors analysis were important research.It helps to manage the shale gas wells scientifically and to improve the effect of shale gas field development.With field data of Changning-Weiyuan national experimental area,a new technique was constructed to evaluate the gas-bearing property of shale reservoir and to analyze its influence factors.We launched quantitative analysis by using the feature attributes data.The technique could automatically divide the gas formation into different layers for multiple gas wells and launch the quantitative analysis of influencing factors.By using the aggregation clustering method and multiple discriminal method,the shale gas reservoirs were divided into three types,type Ⅰ,Ⅱand Ⅲ.Discriminant functions were established for these three class gas reservoirs.The influencing factors were analyzed by using multivariate statistical multiplexing principle.The analysis results showed that the gas reservoirs of type Ⅰ were matrix-based shale gas layers,the gas reservoirs of type Ⅱ were fracture-based shale gas layers,the gas reservoirs of type Ⅲ had less fractures than type Ⅱ.The discriminant functions could automatically identify the unknown types of shale gas reservoirs.The main factors influencing the gas content of shale included content of free gas,porosity,content of organic carbon,permeability and content of absorbed gas.The brittle mineral content,burial depth and thickness had a relatively small effect on the gas content of shale.

Key words: Shale gas, Evaluation of gas-bearing property, Fracture-based gas layers, The content of organic carbon, Influencing factors

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