

论文

川南富集区龙马溪组页岩气储层孔隙结构分类

陈尚斌, 夏筱红, 秦勇, 付常青, 胡琳

1.中国矿业大学 资源与地球科学学院, 江苏 徐州 221116;
2.中国矿业大学 煤层气资源与成藏过程教育部重点实验室, 江苏 徐州 221116

摘要:

运用压汞法测定川南龙马溪组页岩气储层孔隙特征, 结合有机碳含量(TOC)、矿物成分进行多元回归分析, 探讨孔隙主要影响因素, 并对孔隙进行分类。结果表明, 孔隙度平均为4.71%, 发育程度中等; 储集空间由超大孔、大孔、中孔、小孔和微孔组成; 中孔、小孔和微孔为主要孔径, 6~120 nm的孔隙占有重要比例; TOC和脆性矿物对孔隙形成有积极意义, 且TOC影响最显著; 黏土矿物相反, 且其影响程度远小于TOC和脆性矿物含量。基于退汞曲线-TOC成因, 将龙马溪组孔隙结构划分为3种类型: I型(退汞曲线上凸型, 高TOC), II型(退汞曲线先凸后凹型, 低TOC)和III型(退汞曲线凹型, 中TOC), 其中具有I型孔隙结构的页岩气储层为最有利储层。

关键词: 页岩气储层 孔隙结构分类 龙马溪组 压汞实验

Classification of pore structures in shale gas reservoir at the Longmaxi Formation in the south of Sichuan Basin

Abstract:

Taking the Longmaxi Formation in the south of Sichuan Basin as an example, this paper discussed the main factors influencing the pore structures, and studied the characteristics and classification of pore structures using the multivariate regression analysis which was determined by mercury injection method, total organic content(TOC) and mineral composition. The findings are as follows: the mean porosity is 4.71%; the reservoir space is a composite of five types of pores including ultra-large hole, macropore, mesopore, pore and micropore. The pore size less than 1 000 nm is mainly mesopore, pore and micropore, especially in 6-120 nm regions for large composition. Multiple regression analysis shows that TOC and fragile mineral content are in favor of the pore formation, while the clay mineral is opposite. The influence of clay minerals is far less than that of TOC and fragile mineral content, and the TOC is the most significant factor for the shale pore. Based on the mercury withdrawal curve shape and the TOC, pore structure types are divided into three categories: Type I (the convex part in the mercury withdrawal curve and with high TOC), Type II (the concave part in the mercury withdrawal curve and with low TOC), and Type III (the concave part in the mercury withdrawal curve and with moderate TOC). Type I pore structure is in most favor of shale gas reservoir.

Keywords: shale gas reservoir; pore structure categories; Longmaxi Formation; mercury injection method

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通讯作者: 陈尚斌

作者简介: 陈尚斌(1983—), 男, 甘肃通渭人, 讲师, 博士后

作者Email: shangbinchen@163.com

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 2. 汪吉林, 刘桂建, 王维忠, 张善进, 袁雷雷. 川东南龙马溪组页岩孔裂隙及渗透性特征[J]. 煤炭学报, 2013,38(05): 772-777
 3. 韩双彪, 张金川, 邢雅文, 何伟, 谢忱, 姜生玲, 张鹏. 渝东南下志留统龙马溪组页岩气聚集条件与资源潜力[J]. 煤炭学报, 2013,38(S1): 168-173
 4. 黄金亮, 邹才能, 李建忠, 董大忠, 王社教, 王世谦, 王玉满, 李登华. 川南志留系龙马溪组页岩气形成条件与有利区分析[J]. 煤炭学报, 2012,37(05): 782-787
 5. 陈尚斌, 朱炎铭, 王红岩, 刘洪林, 魏伟, 方俊华. 川南龙马溪组页岩气储层纳米孔隙结构特征及其成藏意义[J]. 煤炭学报, 2012,37(03): 438-444
 6. 张小龙, 李艳芳, 吕海刚, 闫建萍, 妥进才, 张同伟. 四川盆地志留系龙马溪组有机质特征与沉积环境的关系[J]. 煤炭学报, 2013,38(05): 851-856
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