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泥页岩储层岩石力学特性及脆性评价

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摘要:

泥页岩储层的岩石力学特性对油气开发影响极大,进行泥页岩力学特性和脆性评价方面的研究,可以为泥页岩油钻井和压裂设计工作提供技术支持。实验研究表明,泥页岩抗压强度与围压、杨氏模量成正相关;体积应变随杨氏模量减小而增大,随泊松比增加而增加;泥页岩破坏在低围压下以劈裂式破坏为主,高围压时多出现剪切式破坏。泥页岩的脆性与其弹性参数和矿物组成关系密切,通过数值模拟和实验测量,综合弹性参数和矿物组分两种方法提出了一种新的脆性评价方法-弹性参数与矿物成分组合法(EP&MC Method),并实现了单井脆性评价,效果较好。脆性评价既是储层岩石力学特性分析的重要内容,也是压裂选层的重要依据。

英文摘要:

Rock mechanical properties of shale gas reservoir are vitally important for exploitation. It is necessary to conduct laboratory study on mechanical properties and brittleness evaluation of shale, which can provide technical support for drilling and fracturing design. Experimental investigations show that compressive strength has positive correlations with Young's modulus and confining pressure. Volume change of rocks before and after fracturing increases with decreased Young's modulus and increased Poisson's ratio. Failure mode under low confining pressure is predominantly splitting failure, while shear failure mode is dominant under high confining pressure. Brittleness of shale has close relations with shale elastic parameters and mineral constituent. Based on numerical modeling and experimental measurement, in combination with elastic parameters method and mineral constituent method, a new brittleness evaluation method is proposed, and brittleness evaluation of single wells is realized which has better effect. Brittleness evaluation is useful for understanding reservoir mechanics and selecting fracture section.

关键词: [泥页岩](#) [岩石力学](#) [破裂模式](#) [弹性参数](#) [矿物组分](#) [脆性评价](#)

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