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非常规天然气

干酪根溶解理论及其在页岩气评价中的应用探索

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摘要:

通过引入干酪根溶解理论及在其基础上发展而来的生烃、排烃模型，指出Ⅱ型干酪根在较高演化程度（转换率>75%)下，液态烃(C_{6-15}+)的排烃效率高于69%，气态烃（C_{1-5})的排烃效率高达97%。计算得到Ⅱ型干酪根在高演化阶段的滞留气量（非页岩总滞留量)为2.84mg/gTOC.由干酪根溶解理论模型所得干酪根滞留气量间接反映页岩中吸附气所占比例不大，而由有机质降解，成岩作用（如蒙脱石向伊利石转换)或者构造运动而形成的孔隙和裂缝中的游离气含量较高，是页岩气产量的主力贡献。在页岩气区带优选及井位选择时需要特别重视寻找微米—纳米孔及天然微裂缝发育的“甜点区”。

关键词: 干酪根溶解理论 排烃 页岩气 吸附气 游离气

Kerogen Solution Theory and Its Exploratory Application in Shale Gas Assessment

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Abstract:

This article introduces the kerogen solution theory as well as a hydrocarbon expulsion model on its basis and brings forward the conclusions as follows.As to the kerogen（TypeⅡ）of high matured（TRHI>75%）,the expulsion efficiency of oil (C_{6-15}+) exceeds 69% and the expulsion efficiency of gas（C_{1-5}）can reach as high as 97%.The result calculated shows that the gas retained in high matured kerogen (TypeⅡ) is about 2.84mg/gTOC（not total gas content of shale）.The writers explore to apply the kerogen solution theoretical model to indirectly characterize the content of adsorbed gas and come to the conclusion that gas adsorbed in shale accounts for a small proportion.While the content of free gas within pore or fracture created through diagenesis (like montmorillonite transforming to illite),kerogen degrading or structural activity is high,making a significant contribution to the production of shale gas.Therefore,much more importance should be attached to finding the "sweet spots" where micro\|nanopores and nature micro\|fractures develop in the activity of shale gas exploration & development.

Keywords: Kerogen solution theory Hydrocarbon expulsion Shale gas Adsorbed gas Free gas.

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