

天然气地质学

酒泉盆地酒东坳陷下白垩统低孔渗储层成岩作用研究

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摘要:

酒东坳陷油气储层具有低孔低渗和特低孔特低渗特征, 储层物性差严重制约着该区石油天然气的勘探和开发。通过岩石薄片、铸体薄片、荧光薄片、X-射线衍射和扫描电镜等手段对该区储层岩石学特征、成岩阶段和成岩作用类型及对物性的影响进行了研究, 结果表明, 下白垩统储层目前处于晚成岩A期和晚成岩B期, 主要成岩作用类型为压实作用、胶结作用和溶蚀作用。近物源快速堆积导致储层分选和磨圆差, 矿物成分成熟度低; 在埋藏过程中, 强烈的压实作用是导致储层低孔低渗的根本原因; 粘土矿物和碳酸盐胶结物含量高, 分布不均并且与沉积环境有关, 它们是造成储层物性降低的主要胶结物; 碳酸盐胶结物充填于孔隙中增强了储层抗压实能力, 并为后期溶蚀溶解作用提供了物质基础; 酸性流体使碳酸盐胶结物和长石被溶蚀及溶解而产生大量次生孔隙, 有效地改善了深部储层的物性。

关键词:

Diagenesis of Lower Cretaceous Reservoir Sandstones from Jiudong Depression in Jiuquan Basin

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Abstract:

Reservoir sandstones in Jiudong depression were characterized by low porosity and low permeability and poor reservoir properties were restrictive factors for oil and gas explorations.Here we studied the petrography,diagenetic stage and diagenesis of this area,and their effects on reservoir quality based on analyses of thin sections,SEM observations,casting thin sections and fluorescence thin sections,X-ray diffraction and mercury porosimetry measurements.The reservoir sandstones of lower Cretaceous were at the late diagenetic stage A and B,with the diagenesis of compaction,cementation and dissolution.The reservoir sandstones were poor sorted,poor rounded and showed near-source characteristics.Compaction was the main factor that caused the tight reservoirs in the buried history.Clay and carbonate cements with high contents in sandstones distributed inhomogeneously,which was related to different sedimentary environments.Clay and carbonate cements were important factors controlling the quality of reservoirs.Carbonate cements greatly preserved the porosity in eodiagenesis by prevention of early mechanical compaction,and generated secondary pores in the late diagenesis by dissolution.Dissolution of feldspar grains and carbonate cements created a secondary porosity zones,thus greatly improved the reservoir qualities.

Keywords:

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