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辽东湾JZS潜山变质岩风化壳识别及储集特征

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Development and Distribution of the Metamorphite-weathering Crust and Its Feature of Reservoir-property for the JZS Buried Hill,Liaodongwan Area

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PDF (PC)

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摘要/Abstract

摘要 :

应用元素分析、X-射线衍射分析和测井响应识别了辽东湾地区JZS潜山变质岩顶部风化壳,确定了其厚度分布。通过岩心观察与铸体薄片鉴定,指明了风化壳储集空间成因类型及其与下部基岩储层的差异,最终应用测井孔隙度、渗透率和试油资料,综合分析了风化壳储集物性与产能特征。结果表明,JZS潜山变质岩风化壳缺失土壤层与残积层,由半风化岩石组成,厚度一般介于6~34m之间,但在断层带可以超过100m;风化壳发育构造裂缝与溶蚀孔隙,孔隙度可以达到10%,但是普遍被风化产物(钙质、铁质和黏土矿物等)充填或半充填,导致渗透率普遍很低,非均质性强;因此,风化壳产能较低,甚至没有产能,是较差的储层。比较而言,风化壳之下基岩储层裂缝与碎裂孔隙发育,风化淋滤与充填作用极微弱,储集物性好,产能超过200m³/d,是好的储层。

关键词: 变质岩潜山, 风化壳识别, 储集物性, JZS潜山, 辽东湾

Abstract:

The top weathering-crust (W-crust) was identified and its thickness was determined for the JZS metamorphite-buried hill in the Liaodongwan area,using element analysis,X-ray diffraction analysis and well logging.The genetic pore types for the W-crust were discerned and their differences were revealed from its underlying basement rock by means of core and cast thin section observation.Finally,the reservoir-physical properties and oil-productivities for the W-crust segment were characterized with the data as well-logging porosity and permeability and well performance testing.It is suggested that the W-crust consisted of semi-weathering rock,being lack of top palaeosoil and eluvium.The thickness of the W-crust often ranged from 6m to 34m,but over 100m in fault zone.In the W-crust,both tectonic fractures and pores by leaching were abundantly developed with up to 10% porosity,but permeability was low and it is heavy heterogenous because most of the fractures and pores were filled or/and semi-filled with such materials as calcite,Fe-oxidate and clay minerals which originated in weathering.Consequently,the W-crust segment had low,even none of oil-productivity,being indicative of bad quality reservoir.In contrast,the underlying basement abundantly developed fractures and cataclastic pores,with little filled minerals,resulting in good quality reservoir with over 200m³/d oil productivity.

Key words: Metamorphite buried hill, Weathering crust identification, Reservoir-physical property, JZS buried hill, Liaodongwan

中图分类号:

TE122.2

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