



Contribution ID: 1097

Type: Poster

## Differential diagenesis and pore evolution mechanism of restricted platform carbonate reservoirs

Thursday, 17 May 2018 12:15 (1h 30m)

The reservoir heterogeneity of the restricted platform in the Mishrif formation of Iraq HF oil field is strong, different microfacies experience different diagenesis and pore evolution process, and the seepage characteristics are different. Therefore, to clarify the differential diagenesis and pore evolution mechanism is the basis of improving development effect. Based on core observation, physical property, mercury injection capillary pressure test, casting thin sections, scanning electron microscopy, cathodoluminescence, electron probe and fluid inclusion analysis, the sedimentary characteristics, diagenesis and the evolution process of pore are systematically studied.

The results show that: (1)The restricted platform can be divided into bioclastic shoal, inter-shoal and intraplatform shallow. The bioclastic shoal is located in high landform of strong hydrodynamics, with mainly composed of bioclastic packstone and grainstone. The inter-shoal forms between the shoal of medium hydrodynamics, which is given priority to bioclastic wackstone. The intraplatform shallow is in a lower area with deep water of weak hydrodynamics, dominated by mudstone. (2)On the basis of sedimentation, the restricted platform experiences sea water cementation, selective dissolution and cementation of atmospheric freshwater, and neomorphism during penecontemporaneous period, compaction in the shallow burial period, unselective dissolution of atmospheric freshwater and cementation in the uplift period, burial dissolution and cementation, compaction, pressure dissolving and dolomitization in the medium-deep burial period. (3)The constructive diagenesis, which makes the pore and throat become larger, includes three kinds of dissolution and neomorphism, resulting in intergranular dissolved pore, mould pore and intragranular pore. The destructive diagenesis consists of three kinds of cementation, compaction, pressure dissolving and dolomitization, blocking the primary and secondary pore. The different types of diagenesis have different degrees of and effects on different microfacies, showing polarization characteristics. (4)The bioclastic shoal has a high frequency of exposure. It mainly experiences seawater cementation, neomorphism and three types of dissolution. The primary pore first decreases and then increases, dominated by high-energy sedimentary facies and constructive diagenesis, which forms the medium large pore-middle thin throat reservoirs with middle-high permeability, and it is the main position of high yield wells. The inter-shoal mostly undergoes three kinds of cementation, atmospheric water dissolution, compaction and pressure dissolving, the primary pore first decreases, then increases and finally becomes smaller, it is dominated by middle-low energy sedimentary facies and synthetic diagenesis, resulting in middle pore-micro throat reservoirs with middle-low permeability, and it is the main area of middle yield wells. The intraplatform shallow in diagenetic stage is basically not exposed, mainly experiences three kinds of cementation, compaction, pressure dissolving and dolomitization, the primary pore decreases all the time, controlled by low energy sedimentary facies and destructive diagenesis, which forms the small pore-micro throat interlayers with low permeability, and it is the main region of low yield wells.

### References

- [1] Jiang S, Cai D, Zhu X, et al. Diagenesis of Liao Zhong sag in Liaohe depression and pore evolution in its middle-deep strata[J]. Oil & Gas Geology, 2007, 28(3):362-369.

[2] Ren D Z, Sun W, Tian H, et al. Research on the characteristic of diagenesis and porosity evolution of Chang 6 Reservoir in Jiyuan Oilfield, Ordos Basin[J]. Journal of Northwest University, 2016.

[3] Jiao X, Wang X, Feng P, et al. Microstructure Evolution and Pore Formation Mechanism of Porous TiAl<sub>3</sub> Intermetallics via Reactive Sintering[J]. Acta Metallurgica Sinica, 2017:1-9.

## Acceptance of Terms and Conditions

[Click here to agree](#)

**Primary authors:** YU, Yichang; Prof. SONG, Xinmin (Petrochina Research Institute of Petroleum Exploration and Development ); Prof. GUO, Rui (Petrochina Research Institute of Petroleum Exploration and Development ); Dr LIU, Hangyu (Petrochina Research Institute of Petroleum Exploration and Development ); Dr LI, Fengfeng (Petrochina Research Institute of Petroleum Exploration and Development )

**Presenter:** YU, Yichang

**Session Classification:** Poster 4

**Track Classification:** MS 1.20: Porous media evolving mechanism, theory and its applications in energy engineering