Effect of Carbonate Micro-texture Types on Cambrian Reef-flat Reservoir in Tarim Basin, NW China

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More and more huge oil and gas reservoirs of reef-beach are being gradually discovered in the world, which is attracting more and more interests of geologists on researches of reef-flat reservoir. Reef-flat was widely developed in Cambrian carbonate platform margin of Tarim basin, NW China, which was a complex deposition composition of cyanobacteria microbialite and grain-beach dolomite.

According to outcrop and the drilling data, pores of Cambrian reef-flat mainly developed in microbiological dolomite and grain-beach dolomite. Texture of microbialite includes clotted texture, laminated texture, spongiostromata texture and dendrolitic texture. And dolomite with spongiostromata texture is the most preferable reservoir. Another important constituent of dolomite reservoir in reefflat of Tarim basin is grain-beach dolomite, the grains composition are mainly oolites, mainarenite, calcirudite and epiphyton. Geochemical analysis of grain-beach dolomite indicated Sr/Ba is 0.6 and the value of 87Sr/86Sr ranges between 0.7095 and 0.7108, which is significantly higher than the global Cambrian seawater value. The data reflected obvious atmospheric freshwater characteristics. Pores types of grain-beach dolomite include residual intergranular dissolved pores, intragranular dissolved pores, breccias dissolved pores, and large-scale dissolved pores and cavities. Compared to dolomite with microbial textures which commonly develops millimeter-scale pores, the dissolved pores and cavities of grain-beach dolomite could be up to 5-10cm, and its average porosity is 7.4% and the maximum porosity is up to 11.2%.

In general, types of carbonate micro-texture control the diversity of reservoir types in the reef-flat and reservoir heterogeneity.The primary cavities in dolomite with spongiostromata texture provided congenital advantages to form better reservoir, while grain-beach dolomite on the top of the reef-flat which was under intensive corrosion of atmospheric freshwater, which provided prerequisite conditions for karst reservoir.

[1] Moore CH (2001) Amsterdam. Elsevier 145-183.

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