Microbial organisms would be dominated in earth before emergence of macro reef-building organisms or after their mass extinction. The rocks formed by or associated with microbial organisms are all termed as microbolite. The microbolites are well spread in lower paleozoic and older strata in China, but they are greatly underestimated for hydrocarbon reservoir.

Based on the outcrop section measurement and thin section identification, three types of microbial carbonate reservoir have been found in Xiaoerblak Formation in Lower Cambrian, Tarim basin. The microbial organisms are mainly cyanobacteria, with the Epiphyton and coccoid identified under microscope.

The first type of microbial carbonate reservoir is microbial reef-mound, with 60 to 80 meters thick. The lamellar microbial mound develop in lower part, composed of deep grey pelletal, fine grained microbial dolomite with stromatactoid cavities; the microbial reef locates in the upper part, composed of dendrolite, thrombolite with bitumen-filled dissolved pores.

The second type is microbial rudaceous dolomites, with 20 to 40 meters thick. The dark irregular magin is microbial coats, surrounding the light pores or vugs with silt-sized crystalline dolomite filled.

The third type is light grey microbial stromatolite dolomites, with 15 to 20 meters thick. The fenestra pores are well developed with surface porosity up to 5~8%. The stromatolite is formed by coccoid cyanobacteria, and the half-filled dissolved pores develop laminally.

The microbial organisms could be closely related to the source rock as well as reservoir. It has great significances to do researches on microbial carbonate reservoir for the hydrocarbon exploration in deep and old carbonate in China.

Key words: microbial carbonate reservoir, reef, mound, dendrolite, thrombolite, microbial rudaceous dolomites, stromatolite