In the process of oil and gas exploration, Hydrocarbon Assessment become more and more important. In this paper, the effect on hydrocarbon of the physical properties of the third member of Shahejie Formation in Dawangzhuang area is analyzed. By logging data analysis, the oil-saturation grade of Es3 in Dawangzhuang region can be divided into rich in oil, oil immersion, oil spots, fluorescence. In this paper, the factors of oil-bearing were analyzed. The method mainly is by mercury experiments, porosity and permeability analysis to obtain experimental data, then drawing cross-plot.

By porosity and permeability analysis, the porosity value of Es3 in Dawangzhuang area are between 3.09% - 21.48%, with an average of 12.65%; permeability value is between 0.013mD-162mD, with an average of 14.83mD. Though mercury data, median pore radius, average pore throat radius, maximum pore radius, reservoir quality index can be calculated. Wherein the median pore radius are distributed between 0.04-2.88μm, with an average of 0.84μm; average pore throat radius are distributed between 0.02-20.35μm, with an average of 8.06μm; maximum pore radius are distributed between 0.21-73.5μm, with an average of 8.2μm. The square of reservoir quality index are distributed between 0.002-10.87, with an average of 0.97.

According to the obtained parameters, many cross-plot were drew including porosity - permeability cross-plot, the median pore radius - permeability Cross-plot, average pore throat radius - permeability cross-plot, the maximum pore radius - permeability cross-plot, the median pore radius - porosity cross-plot, average pore throat radius - porosity cross-plot, maximum pore radius - porosity cross-plot, median pore radius - reservoir quality index cross-plots, average pore throat radius - reservoir quality index cross-plot, maximum pore radius reservoir quality index cross-plot. However, only reservoir quality index has a good discriminant validity to oil-bearing (Fig. 1).

The figure show that when the reservoir quality parameter is 0.8, it is the demarcation point of oil-bearing reservoir and non-oil-bearing reservoir. When the reservoir quality parameter is greater than 0.8, it is non-oil-bearing reservoir. When the reservoir quality parameter is less than 0.8, it is oil-bearing reservoir. Analyzed by logging data, non-oil-bearing reservoir was away from oil sources, although its physical properties was relatively good, but it is lack of oil and gas sources. When the reservoir quality parameter is less than 0.8, median pore radius is also a factor of oilness. High value of reservoir quality parameters and the high value of median pore radius of reservoir show rich in oil; moderate value of reservoir quality parameters and moderate value of the median pore radius show the oil spots; low value of reservoir quality parameters and high value of the median pore radius show oil immersion; high value of reservoir
quality parameters but low value of the median pore radius show fluorescence. At the same time, from an average pore throat radius - reservoir quality index cross-plot, maximum pore radius - reservoir quality index cross-plot also found the same phenomenon.

Some porosity of samples are similar but permeability are significantly different; some permeability of samples are similar but porosity are different. This difference in physical properties relationship, must be controlled by microscopic pore structure of the core. Further analysis of the data found that "the ratio of the permeability and porosity " have a good relationship with pore structure. The greater the value, the better the pore structure. The reservoir quality index and the mercury parameters have a good correlation. The combination of the two parameters have a better reflection of oil-bearing differences.

Therefore, the above analysis results: the factors of oil-bearing of sandstone reservoirs of Es3 in Dawangzhuang areas are mainly reservoir quality parameters and pore radius, the combinations of them can be a good area to separate the oil-saturation grade.

Acknowledgements
We would like to thank the National Science Foundation of China (Grant No. 41302101, 41330313) for financially supporting this project.

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