

Diagenesis Types and Processes of Volcanic-rock Reservoirs

MAO ZHIGUO^{1,2*}, ZHU RUKAI^{1,2}, WANG JINGHONG^{1,2}, SU LING^{1,2}, LUO ZHONG^{1,2}

¹Research Institute of Petroleum Exploration and Development, Petrochina, Beijing, China

²National Energy Tight Oil & Gas Research & Development Center, Beijing, China;

(*correspondence: maozhiguo@petrochina.com.cn)

Background and methods

A large number of volcanic-rock reservoirs have been found in the sedimentary basin of China in recent years, such as the Mesozoic-Cenozoic reservoirs in Songliao basin and Bohai Bay basin, and the the late Palaeozoic reservoirs in Junggar Basin, Santanghu basin and Tarim basin.

According to microscopic analysis of a large number of drilling core samples by microscopy, scanning electron microscopy and X-CT, it is found that various diagenesis effect on volcano rocks in the reservoir forming process, such as crystallize differentiation, solidification, weathering leaching, dissolution, alteration, devitrification. And their action processes show the characteristics of stages and periods obviously. these volcanic reservoirs are mainly developed 3 types of reservoir space: primary pore, secondary pore and fracture.

Results and Conclusion

1) Diagenesis of volcanic-rock reservoirs can be divided into two types: constructive diagenesis and destructive diagenesis. The constructive include condensing shrinkage, weathering, dissolution, devitrification, corrosion etc. And the destructive include crystallization, metasomatic alteration, cementation etc.

2) it is possible to divide the diagenesis processes of volcanic rocks into two stages (solidification stage and re-construction stage) and further into five periods (volcanic active period, solidification period, hydrothermal period, weathering & leaching period, burial period).

Acknowledgement: This work was sponsored by National Key Basic Research Program of China (973 Program, 2014CB239000, 2009CB219304), and National Science and Technology Major Project of China (2011ZX05001).