

Diagenetic clay minerals and reservoir quality of the upper triassic sandstone in euphrates graben, East of Syria

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© SGEM2018. During diagenesis process, the upper Triassic sandstones Mulussa F reservoir have experienced multiple diagenetic transformations which have an important influence on the petrophysical properties of the reservoir, among them, the influences of the diagenetic/authigenic clay minerals precipitation. Conventional core analysis CCA data combined with petrographical observations have been used to characterize the upper Triassic sandstones reservoir parameters and to define the influence of the diagenetic clay minerals on reservoirs quality. Diagenetic clay minerals are found in a wide variety of morphologies as confirmed by Scanning Electron Microscope SEM analysis, and mostly are represented by; kaolinite, illite, chlorite and mixed layers of illite-smectite. The porosity and permeability of the upper Triassic sandstones Mulussa F reservoir were reduced by the platelets or booklet of the authigenic kaolinite which arranged as sub to euhedral blocky structures measure between 20 to 60 μm in length and partially or completely filled pore spaces. Some pores are occluded by the precipitation of the authigenic chlorites that are commonly occurred as grain coating, or pore-filling/lining phase. Authigenic illite and mixed layers of illite-smectite also played as an important factor in reducing the porosity of the upper sandstone reservoir where they are founded as grain coating or pore filling phase composed of well-crystallized lath-like blades (10 μm), and short fiber-like morphology partially filled the intergranular pore and has nucleated at the margins of detrital clay surfaces.

<http://dx.doi.org/10.5593/sgem2018/1.4/S06.052>

Keywords

Clay, Diagenetic, Euphrates graben, Reservoir quality, Syria, Upper triassic

References

- [1] Litak, R. K., Barazangi, M., Beauchamp W., Seber, D., Sawaf, T and AL-Youssef, W. (1997). Mesozoic-Cenozoic evolution of the intraplate Euphrates fault system, Syria: Implications for regional tectonics, *Journal of the Geological Society* 154 (3), pp. 653-666.
- [2] De Ruitter, R. S. C., Lovelock P and Nabulsi N. (1995). The Euphrates graben of eastern Syria: A new petroleum province in the northern Middle East, *The Middle East Petroleum Geosciences*, Gulf Petrol ink, Manama, Bahrain 1 (5), pp. 357-368.
- [3] Barazangi, M., Seber, D., Chaimov, J., Best, J., Litak, R., Al-Saad, D and Sawaf, T. (1993). Tectonic evolution of the northern Arabian plate in Western Syria. *Kluwer Academic Publishers* 15 (5), pp. 117-140.

- [4] Sawaf, T., Zaza, T and Syrriah, O. (1993). The distribution and litho-stratigraphic base for the sedimentary formations in the Syria Arab Republic, Special published report, Syria Petroleum Company, Damascus, Syria 13 (3), pp. 173-190.
- [5] Al-Otri, M., Ayed, H. (1999). Evaluation of hydrocarbon potentials of the sedimentary basins in Syria. Evaluation of hydrocarbon potential in Arab sedimentary basins, E'cole Nationale Supérieure des pétroles et Moteurs, France. 5 (15), pp. 76-77.
- [6] Brew, G., R. Litak, M. Barazangi and T. Sawaf. (1999). Tectonic evolution of northeast Syria: regional implications and hydrocarbon prospects, GeoArabia 4 (3), pp. 289-318.