

Authigenic Mineralogy in Nubian Sandstone Reservoirs

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The reservoir characteristics of the sandstones are discussed in terms of the factors influenced the reservoir quality during diagenesis processes which are cements and clays. The effects of these factors have been understood in more details during sedimentological, petrographical and scanning electron microscope studies, which indicate authigenic clays and authigenic cements, have an importance influence on the reservoirs productivity.

Authigenic clays occur as pore linings, pore fillings, and fracture fillings.

Sandstones also contain allogenic clays. Allogenic clays originate as terrigenous material (dispersed matrix, or shale clasts) or are introduced subsequent to deposition as a result of bioturbation or infiltration. An authigenic origin can be established on the basis of clay composition, morphology and sandstone textural properties. Distinctions between authigenic and allogenic clays become difficult if either is extensively deformed by burial or tectonism. Studies of authigenic clays utilizing a combination of thin-section, scanning electron microscope, and x-ray diffraction show that each of the major clay groups exhibit a limited number of distinctive morphologies.

Smectite occurs as highly wrinkled pore linings. Kaolinite most commonly form pore-filling books of stacked pseudo-hexagonal flakes. Chlorite occurs primarily as pore-lining pseudo-hexagonal flakes, or rosette arrangement.

These types of clays blocked the primary and secondary pores and affected the reservoir potential by converting intergranular macro pores to micro porosity and reducing permeability.

Quartz Overgrowth considered the most important type of authigenic cements that affects the pores in this study as result of dissolution of Silica that released by one or more diagenetic processes that apparently are controlled by temperature with time and re-deposit in other location as overgrowth cement. This kind of cement blocked the pore space and affected the reservoir quality.

It is recommended to give these authigenic minerals more investigation in future studies since they have essential influence on potential of sandstones reservoirs.

Biography:

Mohamed Rahoma is a sedimentologist. He works for Libyan Petroleum Institute since 2004 in geology department. He participated in many sedimentological studies of many oil companies operating in the country for the purpose of evaluating the oil capabilities of their reservoirs. He got a chance to improve his experience in geology of reservoirs when his company sent him to Durham University in United Kingdom in 2010. He have also visited many outcrops in the country for research studies projects which his department did in order to correlate the outcrop formation with subsurface formation for different oil fields.