The role and effect of stylolites and stylomottle on the permeability and microporosity of carbonate rocks

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Abstract

The main aim of this study is the role of stylolites and stylomottle in the textural changes of carbonate rocks and also their role on permeability and microporosity in these rocks. For this aim, studing of 1500 thin sections of the rocks with different lithology and various textural characteristics showed that the textural changings in these rocks have been caused by stylolites. Dissolution and displacement of grains as telescopic rotation, displacement of the former stylolites and all kinds of veins, effect of stylolites on the grains rims, accumulation of insoluble matters, the changing in color and form of stylolites are all examples in this instance. The expansion of porosity along the stylolites is often due to the stress interruption and expansion of the sheet cracks around the stylolites during a tensile phase. The passage of fluids through these spaces can cause dissolution and further expansion of porosity. More detailed studies of 50 thin sections under a scanning microscope showed that on very small scales stylolites had porosity and permeability that often spread perpendicular to the surface. Stylolites are very important ducts and pathways for the passage of fluids (oil and gas). These ducts can pass diagenetic fluids (especially dolomitic fluids) through deep burial diagenesis, altering the nature of the rock and making it dolomite, this phenomenon reduces porosity. A network of stylomottle can also change the permeability of the rock, so that in the mud supported facies where the permeability of the rock is low, these stylomottle can be ducts for the passage of fluids.

Keywords*: Stylolite, Stylomotel, Porosity, Permeability, Carbonate rocks, Textural changes.*