

Porosity Characterization and Its Destruction by Authigenic Minerals: Reservoir Sandstones, Mamuniyat Formation, Murzuq Basin, SW Libya

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Abstract : Sandstones samples were selected from cores of seven wells ranging in depth from 5040 to 7181.4 ft. The dominant authigenic cement phase is quartz overgrowth cement (up to 13% by volume) and this is the major mechanism for porosity reduction. Late stage carbonate cements (siderite and dolomite/ferroan dolomite) are present and these minerals infill intergranular porosity and, therefore, further reduce porosity and probably permeability. Authigenic clay minerals are represented by kaolinite, illite, and grain coating clay minerals. Kaolinite occurs as booklet and vermicular forms. Minor amounts of illite were noted in the studied samples, which commonly block pore throats, thereby reducing permeability. Primary porosity of up to 26.5% is present. Secondary porosity (up to 17%) is also present as a result of feldspar dissolution. The high intergranular volume (IGV) of the sandstones indicates that mechanical and chemical compaction played a more important role than cementation of porosity loss.

Keywords : authigenic minerals, porosity types, porosity reduction, mamuniyat sandstone reservoir

Conference Title : ICOGPE 2014 : International Conference on Oil, Gas and Petrochemical Engineering

Conference Location : Istanbul, Türkiye

Conference Dates : December 05-06, 2014