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IMPACT OF CHLORITE CEMENT ON RESERVOIR QUALITY OF THE LOWER DEVONIAN SANDSTONES IN THE GAS FIELD OF TEGUENTOUR, ALGERIA

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Pore lining chlorites are known to be responsible for the preservation of porosity and permeability in deeply buried sandstones because they inhibit the formation of quartz overgrowth. Two cored intervals within the Upper Gedinnian and Lower Siegenian in the Teguentour field were studied. Some intervals are gas bearing whereas others are more productive. The lower Siegenian formation mainly consists of fluvial sandstones. It lies uncomformably upon the Gedinnian mudstones and sandstones along an erosional surface. The later facies indicate tidal influenced deltaic deposits.

Chlorite coatings seem to be involved in the porosity and permeability distribution. The chlorite cement occurs as detrital (?) grain coatings or as pore filling. It has a radial morphology with rosette-like structure. The crystals coarsen up towards the pore centres. These SEM observations as well as the XRD patterns which show even-order diffraction plates much higher than the odd-order ones, suggest an iron-rich chlorite. The best porous and permeable sandstones show amounts of chlorite coating lying between 11 % and 20%. This interval values inhibits quartz overgrowth seems required for preserving primary intergranular porosity within the sandstones. More than 20 % of chlorite coats proclude the pore space.

The morphology and the relatively coarse crystals (up to 2 µm) of such chlorites indicate a high temperature formation, i.e., 120°C at least. The above results as well as the high homogenisation temperatures (156°C) obtained from fluid inclusion analyses within a quartz-filled fracture may explain the high heat flow of the basin and the occurrence of gas instead of oil in the Teguentour field.