Shale oil and shale gas potentialities of Barremian-Albian source rocks in Northern Tunisia

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The Lower Cretaceous is a major petroleum source rock of the North, Northwest, and Northeast of Tunisia. These source rocks are spread over the paleogeographic area of the country which corresponded to the deep-sea paleogeographic domain "the Tunisian furrow" constituting the Northeast end of the southern margin of the Tethys (Fig1). The Hawk pyrolysis results with the geological and mineralogical data make it possible to define three types of unconventional source rock systems related to this domain. These mainly argilo-carbonated and marine-type II organic source rocks can be qualified as three types of unconventional system resources: Low thermal maturity shale oil hybrid system with a combination of juxtaposed organic-rich and organic-lean facies associated with open fractures, combination gas/oil hybrid system, and shale gas hybrid mudstone system. The first system is associated with very high organic matter richness. The transformation ratio recorded in this system ranges from 40 to 50%, hence the hydrocarbon generating potential (HGP) ranges from 50 to 60%. A fraction of this HGP, stored in the rock, is of free hydrocarbons associated with numerous faults creating tow "oil crossover" effects that indicate oil-saturated source rock levels. In the other two systems, the organic matter richness is greatly reduced by the high to a very high degree of maturity (corresponding to the dry gas window in the NW and the combination of oil and/or wet gas window for the NE). Retained hydrocarbons yet stored in shales can potentially be extracted via hydraulic fracturing. They are conserved as a dry gas (methane) in the NW basin and as oil and wet gas in the North and NE basins. The storage capacities in those basins are calculated using organic porosity as a result of the transformation and expulsion of hydrocarbons from the source rocks.

Biography

Rachida Talbi has her expertise in organic geochemistry applied to petroleum source rocks. Her in-depth knowledge of the basic disciplines of geology, in particular, geochemistry, sedimentology, biostratigraphy, and tectonics, allows her to carry out synthesis work on the genesis, migration and possible trapping of hydrocarbons on the geologic basin scale, both in the field of conventional and unconventional oil research. She has built this know-how after years of experience in academic research, teaching and supervision, as well as in the follow-up of research projects. The compilation of organic geochemistry data with observations and geological field studies explains many phenomena that organic geochemistry alone does not elucidate. After trying to work in the field of organic geochemistry of recent environments, she started research on biogenic methane produced in paralic areas (laguna and sebkha) as a future source of energy.

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