702213 Hydrocarbon Generation Potential and Source Rocks Characteristics of Upper Jurassic - Lower Cretaceous Formations in the Southern Part of the Mesopotamian Basin (Zubair Subzone), Southern Iraq

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More than 60 core and oil samples from different wells and different oil and gas fields were selected to determine the thermal history, hydrocarbon generation and migration in four important formations from the Upper Jurassic- Lower Cretaceous period of the Mesopotamian Basin (Zubair subzone), southern Iraq. The study area is situated in the southern part of the basin and covered many important oil and gas fields in the Basrah province. Only few detailed geochemical studies on this important petroleum systems have been published so far (Alsaadoni and Aqrawi, 2000). The aim of this study is to get a more thorough understanding of source and reservoir rock characteristics of the Sulaiy, Yamama, Ratawi and Zubair formations. Sediment and oil samples from important producing oil and gas fields like Rumaila, Nahr Umar, Subba, Zubair, Ratawi, West Qurnah and Toba oil fields were analysed by geochemical and organic petrological methods.

TOC-analyses, Rock-Eval pyrolysis as well as GC-FID and GC-MS measurements on solvent extracted and fractionated samples were performed. To further estimate the thermal maturity of sedimentary rocks vitrinite reflectance values were measured.

Results of this analytical work show that the studied formations are mature and have reached the oil window. Most of the samples in the studied formations can be classified as type II/III or type III kerogen. This coincides with a suboxic-anoxic depositional environment of Sulaiy and Yamama formations while the Zubair formation is suggested to derive from a distal suboxic shelf deltaic environment and the Ratawi formation from an inner shelf neritic environment. Due to the high TOC, S2 and HI values, the Sulaiy, Ratawi, Yamama formations and the shales within Zubair formation are considered as good petroleum source rocks.

Detailed molecular geochemical studies revealed a variabiliy in pristane/phytane ratios, CPI values and biomarker ratios, both for source rocks and oils. These parameters were further used to establish oil families and to correlate oils with their respective source rocks.

References

-Alsaadoni, Fadhil N. and Aqrawi, Adnan A.M., 2000, Cretaceous sequences stratigraphy and petroleum potential of the Mesopotamian basin, Iraq: SEPM (Society for Sedimentary Geology), special publication No.69, ISBN 1-56576-075-1, p.315-334.

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