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Organic Geochemical Characterization of the Ordovician Source Rock in the Chotts Basin, Southern Tunisia

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Abstract : This paper summarizes the results of Rock-Eval pyrolysis and biomarker data of shale samples collected from the Ordovician age (Llanvirnian-Llandeilian) (Azzel Formation) in the Chotts basin southern part of Tunisia. The results are supported by analysis of cutting samples from wells. The Azzel shales has poor to moderate, occasionally good, potential for sourcing oil and gas with Total Organic Carbon (TOC) content varying from 0.80 to 4.49 % and petroleum potential (PP) values varying between 0.68 to 9.20 Kg of HC/t rock in Baguel and Alaguia wells. However, the Azzel Formation show poor to fair TOC and PP in Elfranig and HajBrahim wells not exceeding 1.10% and 1.05 kg HC/t of rock respectively. The Hydrogen Index (HI) and the Oxygen Index (OI) values of 95–165 mg S2/g TOC and of 33–108 mg CO2/g rock relatively show that the Ordovician shales exhibit type II Kerogen that reached the main oil window stage and that the organic matter was bad preserved, Tmax values of 435 – 448°C indicate the organic matter is mature. The biomarker features of the extract samples are characterized by high proportion of tricyclic terpanes that are dominated by C23 and C21 tricyclic terpanes. The hopanes fraction is dominated by C29 and C30 hopanes. The Ordovician shales show a predominance of C27 over C29 steranes (C27/C29>1) and relatively high proportions of diasteranes supporting the shaly character of the source rock.

Keywords : biomarkers, organic geochemistry, ordovician source rock, diasteranes
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