

The effect of clay minerals on primary migration of hydrocarbon in Pabdeh source rock, Karanj oil feild

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Abstract

The Pabdeh formation which is organic matter-rich in its certain layers in some of the oil fields and can be considered as a source rock, has been studied to illuminate the effect of clay minerals and hydrocarbon generation on the primary migration of hydrocarbons of this formation in one of the wells in the Karanj oil field. Based on the rock-eval and XRD results and electron microscopy images before and after heating the selected samples and creation of artificial thermal maturation, it was determined that the illitization in conjunction with hydrocarbon generation process has responsibility for migration of hydrocarbons through the source rock, a process referred to as primary migration. In fact, by maturing the immature source rock in the laboratory trough heating, the illitization process by releasing water, brittle minerals such as quartz and illite and also hydrocarbon production cause local pressure until it reaches the rock's fracture strength. Therefore, the microfractures initiate preferably in low-strength pathway with a high smectite/illite content that converted to brittle minerals (illite and quartz) and could explain primary migration in Pabdeh source rock in Karanj oil field.

Keywords: *Primary migration, Microfracture, Illitization, Artificial maturation, Karanj oil field*