

Application of fluid inclusion to recognition of origin of coarse-crystalline calcite and dolomite cements in Permo-Triassic Kangan and Dalan Formations in South Pars Field, Iran

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Abstract:

Fluid inclusion analysis can be a good approach for studying trend diagenesis of calcite cements in relation with diagenesis environment. In this research, Kangan and Dalan Formations in A well in South Pars Field were considered for fluid inclusion analysis. The South Pars Field, the largest offshore field in the world, is located on the Iran-Qatar border in the Persian Gulf and also is shared by the two countries. Kangan/Dalan carbonates are extremely susceptible to mineralogical and textural changes. Cementation is one of the important diagenetic processes affecting these carbonates. Based on petrographic and fluid inclusion analysis, fluids responsible for the cement precipitation in Kangan and Dalan Formations can be subdivided into three groups. Group 1 is fluid with calcite composition, has Th values (126 °C), and salinity (16 wt.% NaCl equivalent) and is interpreted to have precipitated during early burial from porewater influenced by meteoric water. Group 2 fluid with dolomite composition has Th values (127 °C) and salinity (17 wt.% NaCl equivalent), demonstrated that the coarse dolomite crystals was precipitated possibly during shallow burial. Group 3 occurring along fractures is characterized by high Th values (169 °C) and salinity (17.5 wt.% NaCl equivalent). This data point out to precipitation of this cement from saline brines over a range of temperatures. It means the fluids with higher temperature, migrated from deeper parts of the basin and filled fractures during deep burial. The oil inclusions with yellow fluorescent, can be observed in 3 samples, only in oil layer in Dalan Formation. It can be interpreted that oil inclusions are secondary and oil migration postdate the precipitation of cements.

Keyword: Fluid inclusion, Kangan and Dalan Formations, South Pars Field.