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Molar Enthalpy Fractal Dimension for Characterizing Shajara Reservoirs of the Permo-Carboniferous Shajara Formation, Saudi Arabia

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The quality and assessment of a reservoir can be documented in details by the application of Molar enthalpy. This research aims to calculate fractal dimension from the relationship among Molar enthalpy, maximum Molar enthalpy and wetting phase saturation and to approve it by the fractal dimension derived from the relationship among capillary pressure and wetting phase saturation. Two equations for calculating the fractal dimensions have been employed. The first one describes the functional relationship between wetting phase saturation, Molar enthalpy, maximum Molar enthalpy and fractal dimension. The second equation implies to the wetting phase saturation as a function of capillary pressure and the fractal dimension. Two procedures for obtaining the fractal dimension have been utilized. The first procedure was done by plotting the logarithm of the ratio between Molar enthalpy and maximum Molar enthalpy versus logarithm wetting phase saturation. The slope of the first procedure = $3-D_f$ (fractal dimension). The second procedure for obtaining the fractal dimension was determined by plotting the logarithm of capillary pressure versus the logarithm of wetting phase saturation. The slope of the second procedure = D_f-3 . On the basis of the obtained results of the fabricated stratigraphic column and the attained values of the fractal dimension, the sandstones of the Shajara reservoirs of the Shajara Formation were divided here into three units.