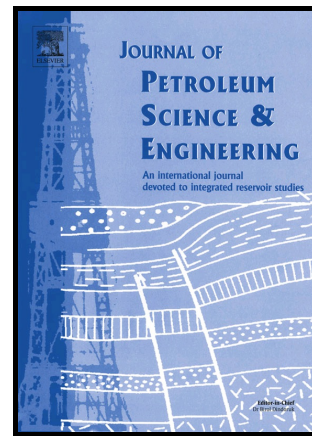


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A Model for Calculating the Formation Resistivity Factor in Low and middle porosity Sandstone Formations Considering the Effect of Pore Geometry

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Abstract

Pore geometry is one of the main factors that may lead Archie's equation inaccurate in low and middle porosity sandstone formations. In order to build a robust relationship between the formation resistivity factor and the porosity for the low and middle porosity sandstone formations, we presented a pore-throat model (PT model) that considered the effect of pore geometry. The PT model is an effective medium model that treats the pore space as a series of a spherical pore and two throats. The spherical pore can be described by the pore radius, and the throat can be described by the ratio of the pore radius over the throat radius (the pore-throat radius ratio) and the tortuosity. We collected seventy-two core plugs from the typical low and middle porosity sandstone formation in the Ordos Basin in China, having porosity ranging from about 3% to 20%. Forty-seven of the samples with low clay content were chosen for laboratory resistivity measurements to validate the PT model. The core experiments and the application to the well

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