عنوان مقاله:

Determination of Minimum Miscibility Pressure in Gas Injection Process by Using ANN with Various Mixing Rules

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خلاصه مقاله:

Miscible gas injection is one of the most effective enhanced oil recovery techniques and minimum miscibility pressure (MMP) is an important parameter in miscible gas injection processes. The accurate determination of this parameter is critical for an adequate design of injection equipment investment prospect. The purpose of this paper is to develop a new universal artificial neural network (U-ANN) model to predict the minimum miscibility pressure of CO_2 and hydrocarbon gas flooding. Different MMP correlations and models have been proposed regarding the type of injection gas and the mechanism of miscibility based on mathematical and thermodynamic calculations respectively. Almost all the correlations proposed in the literature either represent condensing /vaporizing mechanisms or give reasonable results only in a limited range of data they are based on. A new model is introduced by taking into consideration both condensing and vaporizing mechanisms and by using a wider range of data. Experimental data from different crude oil reservoirs obtained by slim tube test have been applied in order to propose a new model. Mixing rules are used to decrease independent variables. The significance of this model is that MMP can be determined for any composition of oil and gas regardless of the fact that which mechanism is dominant in achieving miscibility. Comparing the percentage error of this model with those of the previous literature data showed that the results obtained from the new MMP model were more accurate and universal than most common correlations available.

کلمات کلیدی:

Minimum Miscibility Pressure (MMP), Gas Injection, neural network, Mixing Rules, Critical Property, Slim Tube

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