عنوان مقاله:

Analyzing Single- and Two-parameter Models for Describing Oil Recovery in Imbibition from Fractured Reservoirs

نویسندگان:

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خلاصه مقاله:

The imbibition process is known as one of the main production mechanisms in fractured reservoirs where oil/gas-filled matrix blocks are surrounded by water-filled fractures. Different forces such as gravity and capillary play a role in production from a fractured reservoir during imbibition and complicate the imbibition process. In previous works, single-parameter models such as the Aronofsky model and Lambert W function were presented to model imbibition recovery from matrix blocks. The Aronofsky model underestimates early time recovery and overestimates late time recovery, and Lambert W function is suitable for water wet cases. In this work, a data bank of different experimental and numerical imbibition recovery curves at various rock and fluid properties were collected. Then, a rigorous analysis was performed on the models utilized to describe oil/gas recovery during the imbibition process. In addition to investigating the single-parameter models, two-parameter models used for dose-response modeling, including Weibull, beta-Poisson, and Logit models were examined. The results of this work demonstrate that using two-parameter models can improve the prediction of imbibition behavior. Moreover, among the two-parameter models, the Weibull has the capability to describe the imbibition process better. The Aronofsky model underestimates early time recovery and overestimates late time recovery, and Lambert W function is suitable for water wet cases. In this work, a data bank of different experimental and numerical imbibition recovery curves at various rock and fluid properties were collected. Then, a rigorous analysis was performed on the models utilized to describe oil/gas recovery during the imbibition process. In addition to investigating the single-parameter models, two-parameter models used for dose-response modeling, including Weibull, beta-Poisson, and Logit models were examined. The results of this work demonstrate that using two-parameter models can improve the prediction of imbibition behavior. Moreover, among the two-parameter models, the Weibull has the capability to describe the imbibition process better.

کلمات کلیدی:

Aronofsky model, Dose-response Models, Lambert W Function, Matrix block

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