ONLINE ISSN : 1349-273X
PRINT ISSN : 1346-8804

Journal of the Japan Petroleum Institute
Vol. 46 (2003) , No. 6 pp.396-400

[PDF (128K)] [References]

Mathematical Model of One-dimensional Miscible Fluid Injection in Fractured Porous Media

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(Received: June 19, 2003)

A mathematical model for miscible displacement in fractured porous media is developed. The model takes into account advective, gravitational and crossflow mechanisms of mass exchange between fracture and matrix. The model is normalized by using the dimensionless parameters which characterize the process, and the analytical solutions of the resulting system of equations are provided by utilizing the method of characteristics. The model developed has been compared with experimental results and with previous model, which includes only crossflow between fracture and matrix. There is very good agreement between experiments and this model prediction.

Keywords: Fractured porous media, Method of characteristics, Advection mass transfer, Miscible displacement, Mathematical modeling

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To cite this article:

M. JAMSHIDNEZHAD, M. M. MONTAZER-RAHMATI and V. A. SAJJADIAN,
Journal of the Japan Petroleum Institute, Vol. **46**, No. 6, p.396 (2003) .

doi:10.1627/jpi.46.396
JOI JST.JSTAGE/jpi/46.396