Wei Yan - Publications - DTU Orbit (03/02/2016)

Negative Flash for Calculating the Intersecting Key Tie lines in Multicomponent Gas Injection

Gas injection is a widely used enhanced oil recovery method, and its application is expected to increase in the foreseeable future. In order to build a method of characteristics solution to a two-phase gas injection system, we must construct the composition route from the injection gas to the initial oil where all the intersecting key tielines must be identified. Calculation of these intersecting tielines requires a series of special negative flashes, which allow not only phase fractions outside the physical interval [0,1] but also negative feed compositions. The phase compositions from one negative flash are used to recombine the feed for the next negative flash. Despite the apparent complexity due to multicomponent phase equilibrium and transport, for pure component gas injection, negative flash and elimination of components can be performed in an alternating manner. In particular, if K-values are constant, there exists a simple feature that the vapor fraction roots (beta-roots) for the RachfordRice equation for the initial oil are the roots to be found in all the negative flashes involved. This leads to a simple and well-structured algorithm for the solution with constant K-values. A special problem with pure component gas injection is that there could be two possible roots in the beta-interval of interest. But if the component to be eliminated is left with an infinitesimal amount due to the diffusion or dispersion effects, only the larger root can still give non-negative phase compositions and should thus be selected. For multicomponent gas injection with constant K-values, the vapor fraction roots in all the involved negative flashes are simply from the vapor fraction roots for the initial oil (beta-roots) and those for the injection gas (lambda-roots). By solving just two negative flashes for the initial oil and the injection gas and using proper selection sequences for these beta- and lambda-roots, we can readily determine all the intersecting tielines for constant K-values.

General information

State: Published
Organisations: Center for Energy Resources Engineering, Department of Chemistry, Department of Chemical and Biochemical Engineering, CERE – Center for Energy Ressources Engineering
Authors: Yan, W. (Intern), Michelsen, M. L. (Intern), Stenby, E. H. (Intern)
Keywords: (ENGINEERING,, MINIMUM MISCIBILITY PRESSURE, RACHFORD-RICE, DISPLACEMENTS, EQUILIBRIUM)
Pages: 14094-14112
Publication date: 2014
Main Research Area: Technical/natural sciences

Publication information

Journal: Industrial & Engineering Chemistry Research
Volume: 53
Issue number: 36
ISSN (Print): 0888-5885
Ratings:

BFI (2015): BFI-level 2

BFI (2014): BFI-level 2

ISI indexed (2013): ISI indexed yes

BFI (2013): BFI-level 2

BFI (2012): BFI-level 2

ISI indexed (2012): ISI indexed yes

BFI (2011): BFI-level 2

ISI indexed (2011): ISI indexed yes

BFI (2010): BFI-level 2

BFI (2009): BFI-level 2

BFI (2008): BFI-level 2
Original language: English
DOIs:

10.1021/ie5012454
Source: FindIt
Source-ID: 269524930
Publication: Research - peer-review › Journal article – Annual report year: 2014

Comments on "Measurement and modeling of the solubility of water in supercritical methane and ethane from 310 to 477 K and pressures from 3.4 to 110 MPa"

General information

State: Published
Organisations: Center for Phase Equilibria and Separation Processes, Department of Chemical and Biochemical Engineering, Center for Energy Resources Engineering

Authors: Kontogeorgis, G. (Intern), Yan, W. (Intern)
Pages: 4347-4348
Publication date: 2007
Main Research Area: Technical/natural sciences

Publication information
Journal: Industrial & Engineering Chemistry Research
Volume: 46
Issue number: 12
ISSN (Print): 0888-5885
Ratings:
BFI (2015): BFI-level 2
BFI (2014): BFI-level 2
ISI indexed (2013): ISI indexed yes
BFI (2013): BFI-level 2
BFI (2012): BFI-level 2
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 2
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 2
BFI (2009): BFI-level 2
BFI (2008): BFI-level 2
Original language: English
DOIs:
10.1021/ie070409y
Source: orbit
Source-ID: 262139
Publication: Research - peer-review › Letter – Annual report year: 2007