Petrochemistry-2013

OMICS Group Conferences
Accelerating Scientific Discovery

World Congress on
Petrochemistry and Chemical Engineering

November 18-20, 2013 Hilton San Antonio Airport, USA

A four coefficient model for extending the heptanes-plus fraction for gas condensate systems

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Abstract

An accurate description of pseudo-component compositions and properties provides the heart of Equation of State predictions for gas condensate systems. Very often these extended experimental data are unavailable and must be generated using mathematical models, of which the exponential and the three-parameter gamma distribution functions are the two most widely used. The development of these two techniques was based on the assumption of a continuous molar relationship for pseudocomponents. However, experimental compositional data for gas condensate systems show discontinuities in this relationship at SCN8 and SCN13.

The above models when applied to extend the C_{7+} fraction under-predict the SCN8 mole percent and over-predict the SCN12 mole percent due to the aforementioned discontinuities. The Average Absolute Deviation between the predicted and experimental SCN8 and SCN12 data were both greater than 25%. The two coefficient method described by Ahmed et al. (1984) when applied to extend the C_{7+} fraction, reduced the discontinuity at SCN8 to less than 12%. However the SCN12 group still had a deviation greater than 18%. These results show that existing models were not designed to take care of these discontinuities and should be used with caution when extending experimental data beyond SCN7.

The ‘‘Four Coefficient’’ model described in this study resolves these discontinuities in the molar relationships at both SCN8 and SCN12 with an Average Absolute Deviation between the predicted and experimental compositions of less than 10%. This model can quite easily be included in Equation of State packages for a more accurate description of compositions for gas condensate systems and for performing simulation studies. A partial analysis beyond the C_{7+} fraction is not required with this model.

Biography

Raffie Hosein is a Senior Associate Professor in Petroleum Engineering at The University of The West Indies in Trinidad. Previously he worked as a Petroleum Engineer with the Ministry of Energy in Trinidad and later, as a Senior Associate Professor in the Department of Petroleum Engineering at Texas A&M University at Qatar. He received his B.Sc., M.Phil. and Ph.D degrees in Petroleum Engineering from The University of The West Indies in Trinidad.