

Recent Applications of the CPA Equation of State for the Petroleum and Chemical Industries

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CPA (Cubic-Plus-Association) is an equation of state which has been developed in collaboration and for the needs of the oil & gas and chemical industries [1,2]. It is a variant of SAFT, in the sense that the association term is essentially identical to that of SAFT, but the physical term is taken from a cubic EoS (SRK). The model has been described in detail in a recent monograph [3]. Examples for recent applications of CPA for mixtures of relevance to the petroleum and chemical industries will be presented, mostly obtained as part of an ongoing industrial project (Chemicals in Gas Processing, CHIGP) which focuses on the further development and dissemination of the CPA equation of state. Three areas which will be highlighted are:

- mixtures with acid gases (CO₂, H₂S), water and polar chemicals (alcohols, glycols)
- oil-water-glycols, where comparisons to recently obtained data will be shown
- mixtures containing aromatic acids, biofuels and other polar compounds

The advantages and the shortcomings -where further investigations are needed- of the approach will be discussed.

[1] G.M. Kontogeorgis, E. Voutsas, I. Yakoumis, D.P. Tassios D.P., *Ind. Eng. Chem. Res.*, 35 (1996) 4310-4318.

[2] G.M. Kontogeorgis, M.L. Michelsen, G.K. Folas, S. Derawi, N. von Solms, E.H. Stenby, *Ind. Eng. Chem. Res.* 45, (2006) 4855-4868 and 4869-4878.

[3] G.M. Kontogeorgis, G.K. Folas. Thermodynamic models for industrial applications. From Classical and Advanced mixing rules to association theories, WILEY, 2010.