

A New Generalized Alpha Function for the Patel and Teja Cubic Equation of State

M. Joda^C

*Tehran Oil Refining Company, Ghom Road, Tehran, Iran
MarziehJoda@yahoo.com*

M. Vafaie-Sefti

Department of chemical Engineering, Tarbiat Modarres University (TMU), Tehran, Iran

The approach described in paper [1] is applied to the Patel and Teja Cubic Equation of State (PT CEoS), in order to develop a new generalized alpha function for this equation. The generalized temperature and acentric factor are functions dependent on the attractive term. The alpha function becomes a linear function of the acentric factor at a constant reduced temperature [2, 3]. The first step in generalizing alpha is to derive alpha as a function of temperature for each individual compound. In this work, the alpha function proposed by Twu is used for correlating the vapor pressure data of pure components. This equation has only three adjustable parameters. These parameters can be related to the acentric factor for thirty four components. The computed values of alpha at different reduced temperatures are obtained. These parameters, used in the generalized alpha function, were evaluated by minimizing the objective function for thirty four hydrocarbon components at subcritical and supercritical conditions. It was shown that the new generalized alpha function for the PT CEoS [4] predicts more accurate vapor pressures for polar components and heavy hydrocarbons, as well as saturated liquid densities for polar components and non-polar light hydrocarbons, compared to the Soave-Redlich-Kwong, Peng-Robinson, Hayene, and original Patel and Teja CEoS's.

- [1] C.H. Twu, J.E. Coon, and J.R. Cunningham, *Fluid Phase Equilibria*. **69**, 33 (1991).
- [2] C.H. Twu, J.E. Coon, and J.R. Cunningham, *Fluid Phase Equilibria*. **105**, 49 (1995).
- [3] C.H. Twu, J.E. Coon, and J.R. Cunningham, *Fluid Phase Equilibria*. **105**, 61 (1995).
- [4] N.C. Patel and A.S. Teja, *Journal of Chemical Engineering Science*. **77(3)**, 463 (1982).