

Correlation of Volumes of Mixing for the CO₂ + 1-Pentanol Mixture at Temperatures from 313.15 to 363.15 K and up to 25 MPa.

Abel Zúñiga-Moreno^{C,S}, Alfredo E. Ramírez-López and Elizabeth Juárez-Camacho
Departamento de Ingeniería Química Industrial, ESIQIE-IPN, México, D.F., México

Compressed liquid densities of binary mixtures composed of CO₂ (1) and 1-pentanol (2) were previously measured by Zúñiga-Moreno et al. [1]. In this work, volumes of mixing were calculated using the correlations reported in reference 1 for mixture density calculations, and for pure compounds the correlation reported by Zúñiga-Moreno and Galicia-Luna [2] was used for 1-pentanol, and the multiparameter equation of state reported by [3] was used for CO₂. The volumes of mixing were calculated from 313.15 to 363.15 K at 10 K increments and up to 25 MPa at 1 MPa increments. A Redlich-Kister expansion truncated at the cubic term was used to correlate the volumes of mixing as function of mol composition keeping the temperature and pressure constant. The results are discussed in terms of composition, temperature and pressure. The behavior of the different parameters as function of temperature and pressure suggested that an expression for volumes of mixing as function of temperature and pressure could be developed.

- [1] Zúñiga-Moreno, A.; Galicia-Luna, L. A., Sandler, S. I. *J. Chem. Thermodyn.*, 2008, 40 180–192.
- [2] Zúñiga-Moreno, A.; Galicia-Luna, L. A. *Int. J. Thermophys.*, 2007, 28, 146-162.
- [3] Span, R.; Wagner, W. *J. Phys. Chem. Ref. Data* 1996, 25, 1509–1596.