Measurement and correlation of the solubility of carbon monoxide (CO) in butyraldehydes: n-butyraldehyde and isobutyraldehyde

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The solubility of carbon monoxide (CO) in two butyraldehydes, the isomer of n-butyraldehyde and isobutyraldehyde, was measured by using an equilibrium apparatus equipped with a variable-volume view cell. The solubility of CO was determined by measuring the bubble point pressure at a temperature range from (303.15 to 373.15) K in 10 K intervals with increased pressure up to 90 MPa. The experimental results show that the solubilities of CO increase with increasing pressure and temperature. Moreover, the results also showed that the iso-form, isobutyraldehyde, had better CO solubility than the n-form, n-butyraldehyde, which implies that the solubility of CO was affected by the polarity of the solvent. The measured data was correlated with the Peng-Robinson equation of state (PR-EoS) incorporated with the conventional van der Waals one fluid mixing rule. The calculated results show good agreement with experimental data with the average absolute deviation in percentage (AAD %) below 2.3 %.