

Measurement of high pressure phase behavior for carbon monoxide (CO) in butyraldehydes:  
n-butyraldehyde and isobutyraldehyde

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The solubility of carbon monoxide (CO) in two isomeric butyraldehydes, n-butyraldehyde and iso-butyraldehyde, which are the products of hydroformylation reaction in which CO is a reactant, was measured. The solubility of CO was determined by measuring the bubble point or cloud point pressure for various CO mole fractions at a temperature ranging from (303.15 to 373.15) K at 10 K intervals. From this study, we found that the solubilities of CO increase with increasing pressures and temperatures and iso-form (iso-butyraldehyde) had better CO solubility than the n-form (n-butyraldehyde). 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 result showed relatively good agreement with experimental data with the average absolute deviation of pressure (AAD-P %) of 2.25 % for CO + n-butyraldehyde and 1.64 % for CO + iso-butyraldehyde system.