MEASUREMENT OF VAPOR-LIQUID EQUILIBRIA FOR BINARY SYSTEMS ETHANOL + 2-BUTANOL AND ACETONE + 2-BUTANOL, TERNARY SYSTEM ETHANOL + ACETONE + 2-BUTANOL AT 101.33 kPa

Name : Rizki Aulia Rahman (2310 100 036)
Didik Agus Kurniawan (2310 100 068)
Departement : Chemical Engineering FTI – ITS
Advisor : Dr. Ir. Kuswandi, DEA
Ir. Winarsih

ABSTRACT

The objective of this research to measure vapor-liquid equilibrium (VLE) data for binary ethanol + 2-butanol and acetone + 2-butanol, also ternary systems ethanol + acetone + 2-butanol at 101.33 kPa. The experimental data were correlated using NRTL and UNIQUAC equations. The experimental apparatus used in this experiment was modified Ebulliometer. The validation of experimental apparatus was done by measuring the temperatures of a pure solutions of ethanol, acetone, 2-butanol, and H₂O vapor, and comparing the results with the Antoine equation. For the binary systems ethanol (1) + 2-butanol (3) and acetone (2) + 2-butanol (3) at 101.33 kPa pressure, the results of correlation with NRTL model generate RMSD T and y₁ respectively 0.282 and 0.162; 0.0891 and 0.0597, while the UNIQUAC model respectively 0.412 and 0.153; 0.948 and 0.0582. And for the ternary system ethanol (1) + acetone (2) + 2-butanol (3) at 101.33 kPa, the results of correlation with NRTL model generate RMSD T, y₁, y₂, and y₃ respectively 0.902; 0.09; 0.08; and 0.042, whereas UNIQUAC model respectively 0.786; 0.066; 0.045; and 0.041.

Keyword: vapor-liquid equilibria, binary, ethanol, 2-butanol, acetone, ternary.