

Isothermal Vapor-Liquid Equilibria for the Binary Mixture of Propane (R-290) + Propylene (R-1270)

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In recent years, the utilization of light hydrocarbons as effective refrigerants is believed as good solution for developing CFC Alternative refrigerant in the future because these hydrocarbons are cheap, plentiful and environmentally benign chemicals and have many outstanding properties. Even though, flammability of these materials has caused some concerns, but it was found that hydrocarbon are quite safe in small applications due to very small amounts involved. In order to use mixture of hydrocarbons as multi-component refrigerants, vapor-liquid equilibrium data are required to evaluate the performance of refrigeration cycles and to determine their optimal compositions. In this work, isothermal VLE data for the binary mixture of propane + propylene at ten equally spaced temperatures between 268.15 and 313.15 K were measured by using a circulation-type equilibrium apparatus. The experimental data were correlated with the Peng-Robinson equation of state in combination with the Wong-Sandler mixing rule. It was confirmed that the data calculated by this equation of state have a small difference with experimental values. The azeotropic behaviour was found in this system.