

Determination of Vapor-Liquid Equilibrium for Mixtures of Interest to the Development of Biogasolines

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The European target on decreasing the dependency on the petroleum is being achieved by the use of biofuels and it also reduces the CO₂ emissions and it supports the agricultural community. There are a wide variety of biogenic products (such as alcohols or ethers) that can be added to fuels and the quality of these products becomes more and more important, requiring an accurate knowledge of the thermodynamic properties of the new fuel blends. 1-Pentanol is considered a compound of second generation biogasolines due to its high octane rating (up to 100 Research Octane Number - RON), better water tolerance and very high heat of combustion. In order to improve thermodynamic knowledge of this potential bio-additive for the conventional fuels, the VLE of the ternary system 1-pentanol + isooctane + heptane at 313.15 K has been measured. In addition, the VLE of the corresponding binary systems has been determined at the same temperature. The vapor-liquid equilibrium of these mixtures was determined using a static isothermal technique. The equilibrium properties measured directly and their uncertainties are: injected volume ± 0.03 mL, temperature ± 10 mK, and total pressure ± 5 Pa. The VLE data were correlated using and Wilson, NRTL and UNIQUAC models moreover Margules equation was used for the binary systems and the Wohl expansion for the ternary mixture.

Acknowledgements

A. Moreau thanks the support from European Social Fund (ESF) and from Consejería de Educación de la Junta de Castilla y León.