Comments

Comments on "Liquid−Liquid Equilibria for Mixtures of Water + an Alkanol + a Nitrile Compound at T = 298.15 K" (Letcher, T. M.; Naicker, P. K. *J. Chem. Eng. Data* 2001, *46*, 1436−1441)

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The results obtained by Letcher and Naicker for the composition values of conjugated phases in the systems benzonitrile + methanol + water, benzonitrile + ethanol + water, and benzonitrile + 1-propanol + water differ from those previously published by us.[1,2] The authors state that this difference could be assigned to water content in the alcohols we used.

In our work, ternary mixtures in the two-phase region were prepared by mass and thermostatized during several hours until equilibrium was attained. The composition of the conjugated phases was measured by a gas chromatography technique employing well defined calibration curves for determining benzonitrile and water concentrations. The alkanol calibration curves were obtained by employing analytical grade reagents, which obviously have some water. The amount of water in each sample was determined by applying the corresponding calibration curve to the water peak. Thus, analysis of ternary mixtures was carried out by direct determination of the three components, employing for the alcohol the corrected calibration curve. Hence, the observed differences cannot be ascribed to the lack of consideration of water content of the alkanols.

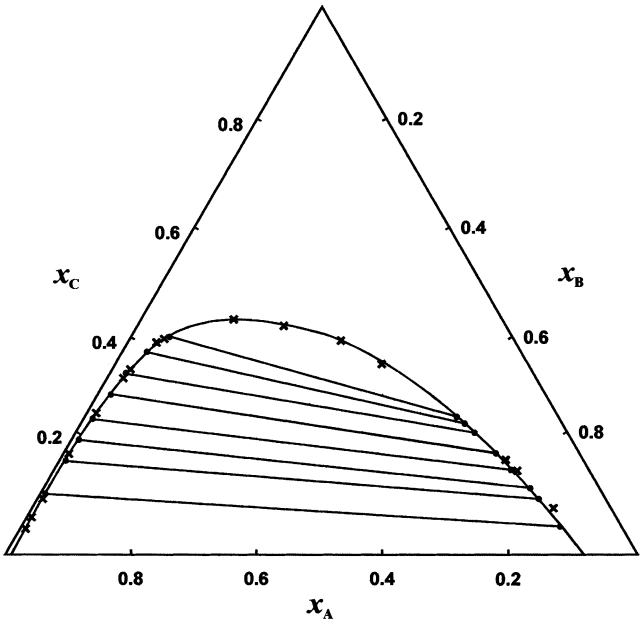

Figure 1. Ternary equilibrium data for the system water (A) + benzonitrile (B) + methanol (C): (×) data from Letcher and Naicker; (●) data from Botto et al.[1]

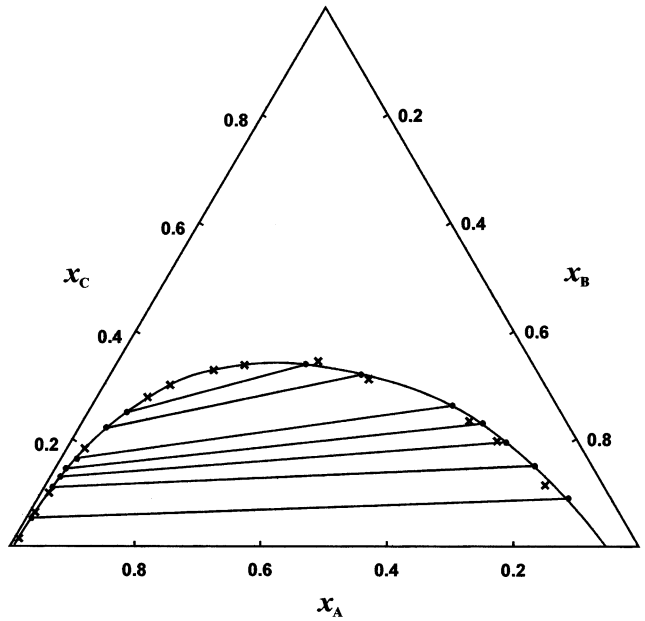

Figure 2. Ternary equilibrium data for the system water (A) + benzonitrile (B) + ethanol (C): (×) data from Letcher and Naicker; (●) data from Grande et al.[2]

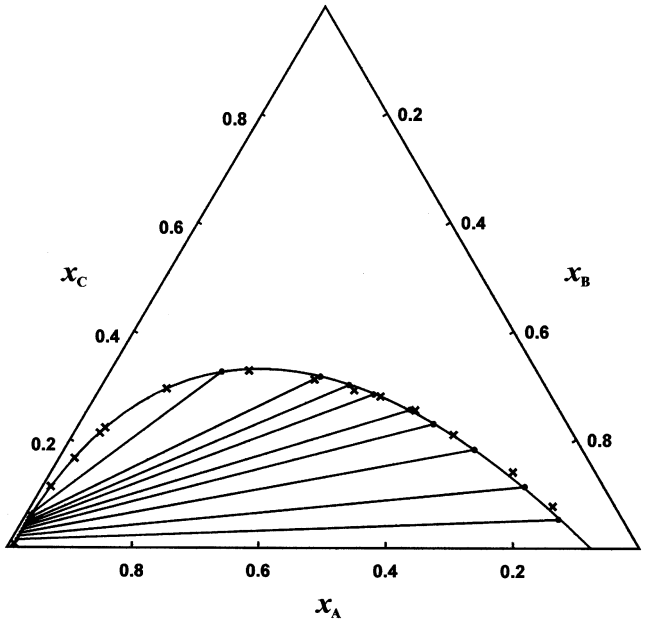

Figure 3. Ternary equilibrium data for the system water (A) + benzonitrile (B) + 1-propanol (C): (×) data from Letcher and Naicker; (●) data from Grande et al.[2]

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In Figures 1−3, our data for the three mentioned systems are shown together with those reported by Letcher and Naicker. It is seen from these graphs that significant differences appear only in benzonitrile-rich mixtures.

This fact is due, in our opinion, to the different experimental approach employed. In our work the equilibrium composition was determined by extracting samples from each phase at regular intervals, until three consecutive measurements yielded the same result within experimental error, a process that takes several hours. Thus, points in the binodal curve and tie lines were determined in a single experiment.

On the other hand, the points on the binodal curve of Letcher and Naicker were determined employing the cloud point technique, which, in the first place, is a qualitative and less accurate measurement and, second, might be further affected by the fact that the rather slow kinetics of the distribution process will give an apparent cloudiness before equilibrium is attained.

Thus, if experimental error in both procedures is considered, and we take into account that significant differences only appear in mixtures with very low water content, where the relative error for this component becomes larger than 5%, it must be concluded that the results obtained inthe work by Letcher and Naicker agree with our data within experimental error.

Literature Cited

(1) Botto, G. J.; Agarás, H.; Marschoff, C. M. Liquid−Liquid Equilibrium Data for the System Water−Benzonitrile−Methanol. *J. Chem. Eng. Data* **1989**, *34*, 382−384.

(2) Grande, M. C.; Fresco, J.; Marschoff, C. M. Liquid−Liquid Equilibrium Data for Water + Benzonitrile + Ethanol or 1-Propanol. *J. Chem. Eng. Data* **1995,** *40*, 1165−1167.

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