

论文

二元体系C₆H₅CH₃-DMF在293.15 K时的体积性质

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摘要:

利用Anton Paar DMA4500振动管密度计测量了293.15 K时二元体系甲苯-*N,N*-二甲基甲酰胺(C₆H₅CH₃-DMF)在C₆H₅CH₃ (摩尔分数0~1)中的溶液密度, 利用最小二乘法关联了溶液密度与组成的函数关系, 关联精度为±0.005 kg/m³. 通过密度数据分别计算了二元体系中C₆H₅CH₃和DMF的表观摩尔体积, 并利用非线性最小二乘拟合法, 分别拟合得到了优化的C₆H₅CH₃和DMF的表观摩尔体积和摩尔分数的函数关系, 以及C₆H₅CH₃和DMF的表观摩尔体积和质量分数的函数关系. 通过对函数关系的极限运算得到了C₆H₅CH₃和DMF的极限偏摩尔体积、标准偏摩尔体积和摩尔体积. 还计算了不同组分下体系的超额摩尔体积, 数据可用四参数Redlich-Kister方程关联拟合得到方程系数. 计算关联了C₆H₅CH₃和DMF的超额偏摩尔体积与摩尔分数的关系. 由三参数多项式极限法得到组分的极限超额偏摩尔体积值与Redlich-Kister系数法得到的值在误差范围内一致.

关键词: 甲苯-*N,N*-二甲基甲酰胺; 表观摩尔体积; 超额摩尔体积; 极限偏摩尔体积; 标准偏摩尔体积; 超额偏摩尔体积; 极限超额偏摩尔体积

Volumetric Properties of Binary System C₆H₅CH₃-DMF at 293.15 K

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Abstract:

The densities of binary solution C₆H₅CH₃-DMF(toluene-*N,N*-dimethylformamide) at 293.15 K were measured by use of the Anton Paar 4500 vibrating-tube densimeter and the dependence of density on molar fraction was fitted by the least-square method with the standard deviation 0.005 kg/m³, the molar fractions of toluene for the binary solution is from 0 to 1. The apparent molar volumes of C₆H₅CH₃ and DMF in the binary system C₆H₅CH₃-DMF were separately calculated from the density data, and the optimized dependences between apparent molar volumes and molar fractions and mass fractions were also determined respectively by the nonlinear least-square regression, and further more, the limiting partial molar volumes, the standard partial molar volumes and the molar volumes of C₆H₅CH₃ and DMF were also obtained from the functions limits. At the same time, the excess molar volumes for the binary solution were calculated and were fitted by the fourth-order Redlich-Kister equation well, so the Redlich-Kister coefficients and the excess molar volume extremum were obtained. Furthermore, the excess partial molar volumes of C₆H₅CH₃ and DMF were calculated and the dependences of the excess partial molar volumes on molar fractions of C₆H₅CH₃ were fitted with the three-parameter polynomial. The limiting excess partial molar volumes of C₆H₅CH₃ and DMF were also obtained from the polynomials limits as well as from the Redlich-Kister equation coefficients.

Keywords: Toluene-*N,N*-dimethylformamide; Apparent molar volume; Excess molar volume; Limiting partial molar volume; Standard partial molar volume; Excess partial molar volume; Limiting excess partial molar volume

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参考文献:

- [1]Liu D. X., Li H. R., Deng D. S., *et al.*. Chin. J. Chem. Eng.[J], 2002, 10(4): 454—458
- [2]CHEN Da-Shu(陈大树), FANG Wen-Jun(方文军), LEI Qun-Fang(雷群芳), *et al.*. Journal of Zhejiang University, Science Edition(浙江大学学报, 理学版)[J], 2002, 29(4): 430—436
- [3]MA Lin(马林), XU Li(许莉), LIN Rui-Sen(林瑞森), *et al.*. Acta Chim. Sinica(化学学报)[J], 2008, 66(1): 129—137
- [4]Peng S. J., Hou H.Y., Zhou C. S., *et al.*. J. Chem. Thermodyn.[J], 2007, 39: 474—482
- [5]Peng S. J., Hou H.Y., Zhou C. S., *et al.*. J. Solution Chem.[J], 2007, 36: 981—995
- [6]Mehrotra K.N., Sharma N.. Chemical Monthly[J], 1996, 127(3): 257—264
- [7]Mehrotra K. N., Jain M.. J. Applied Polymer Science[J], 1993, 50(1): 41—47
- [8]Kent H. E., Lilley T. H., Millburn P. J., *et al.*. J. Solution Chem.[J], 1985, 14: 101—115
- [9]BAI Tong-Chun(白同春), HAN Shi-Jun(韩世钧). Chem. J. Chinese Universities(高等学校化学学报)[J], 2000, 21(2): 273—277
- [10]Xu H., Song Y. L., Hou H. W.. Inorganic Chemica Acta[J], 2004, 357(12): 3541—3548
- [11]Zhang Z. J., Chen X. Y., Zhang X. F., *et al.*. Solid State Communications[J], 2006, 139(8): 403—405
- [12]BAI Tong-Chun(白同春), YAO Jia(姚加), HAN Shi-Jun(韩世钧). Chem. J. Chinese Universities(高等学校化学学报)[J], 1999, 20(5): 777—781
- [13]Geng Y. F., Wang T. F., Yu D.H., *et al.*. Chin. J. Chem. Eng.[J], 2008, 16(2): 256—262
- [14]HOU Hai-Yun(侯海云), PENG San-Jun(彭三军), WANG Xiao-Xian(王晓先), *et al.*. Chem. J. Chinese Universities(高等学校化学学报)[J], 2009, 30(3): 563—567
- [15]Nikos G. T., Alexander C. F.. J. Chem. Thermodyn.[J], 2006, 38: 952—961
- [16]Pandharinath S. N., Sanjeevan J. K.. J. Chem. Eng. Data[J], 2005, 50: 455—459
- [17]Riddick J. A., Bunger W. B.. Techniques of Chemistry, 3rd, Organic Solvents, Vol. I [M], New York: Wiley, 1970
- [18]Acree W. E.. Thermodynamic Properties of Non Electrolyte Solutions[M], New York: Academic Press, 1984
- [19]Mokata O., Ddamba W. A.. Journal of Solution Chemistry[J], 2005, 34(11): 1327—1339
- [20]Orge B., Iglesias M., Marino G., *et al.*. J. Chem. Thermodyn.[J], 1999, 31(4): 497—512

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