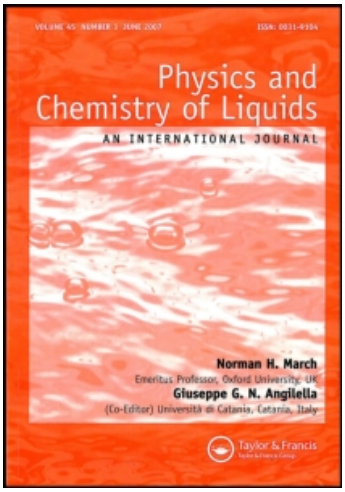

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Excess properties of binary mixtures hexane, heptane, octane and nonane with benzene, toluene and ethylbenzene at $T = 283.15$ and 298.15 K

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Densities, speeds of sound and the refractive indices of binary systems containing alkanes (hexane, heptane, octane and nonane) with aromatic compounds (benzene, toluene and ethylbenzene) at $T = 283.15$ and 298.15 K under atmospheric pressure were determined over the whole composition range. From the experimental results, the derived and excess properties (excess molar volumes, isentropic compressibility, excess molar isentropic compressibility and refractive index deviations) at $T = 283.15$ and 298.15 K were calculated and satisfactorily fitted to the Redlich–Kister equation.

Keywords: density; refractive index; speed of sound; alkanes; aromatic compounds; physical properties

1. Introduction

Aromatic hydrocarbons are very important to the petrochemical industry. Among these are benzene, toluene, ethylbenzene, and xylenes, which are basic raw material for the production of a number of important petrochemicals. Extraction of aromatics from refinery products such us naphtha, kerosene, and fuels jets by liquid–liquid extraction (LLE) has a potential of commercial importance in the oil refining industry. The information about the physical properties of pure liquids and liquid mixtures containing aromatic and aliphatic compounds, and their dependence on composition and temperature are very important basic data for their use in the extraction separation.

The binary systems containing alkanes with aromatic compounds are available in the literature [1–19], above all at $T = 298.15$ K, but experimental data at $T = 283.15$ K [4] are very scarce. The studies in the literature are usually focused on density and excess molar volume. In this article, as the extension of our work concerning to the study of the behaviour of alkanes and aromatics compounds [19,20], the experimental density, speed of sound and refractive index at $T = 283.15$ and 298.15 K under the atmospheric pressure of binary systems containing alkanes (hexane, heptane, octane and nonane) with aromatic compounds (benzene, toluene and ethylbenzene) were determined. The results were used to calculate excess molar

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volumes, isentropic compressibility, excess molar isentropic compressibility and refractive index deviations.

2. Experimental

2.1. *Chemicals*

Hexane, heptane, octane and nonane were supplied by Fluka with purity higher than 99.0%, 99.5%, 99.5% and 99.0%, respectively. Benzene, toluene and ethylbenzene were supplied by Sigma-Aldrich with purity higher than 99.8% for all of them. They were degassed ultrasonically and dried over molecular sieves type 4 Å, supplied by Aldrich and kept in an inert argon atmosphere. Table 1 shows a comparison of experimental and literature data of pure components at $T = 298.15\,\mathrm{K}$.

2.2. *Apparatus and procedure*

Samples were prepared by syringing known masses of the pure liquids into stoppered bottles. For weight measurements, a Mettler AX-205 Delta Range balance with a precision of $\pm 10^{-5}$ g was used. Good mixing was ensured by magnetic stirring. All samples were prepared immediately prior to measurements to avoid variations in the composition due to the evaporation of the components.

Densities and speeds of sound were measured using an Anton Paar DSA-48 digital vibrating-tube densimeter. The uncertainty in experimental measurements has been found to be lower than $\pm 10^{-4}\,\mathrm{g\,cm^{-3}}$ for the density and $\pm 1\,\mathrm{m\,s^{-1}}$ for the speed of sound. The apparatus was calibrated by air and water, according to the manual instructions. The calibration was checked with the pure liquids shown in Table 1.

Table 1. Comparison of experimental density of pure component data with literature values at $T = 298.15\,\mathrm{K}$ and literature data of heat capacity, $C^*_{p,i}$, and isobaric expansibility, $\alpha^*_{p,i}$ at $T = 298.15\,\mathrm{K}$.

	$\rho(\mathrm{g\,cm^{-3}})$		$C^*_{p,i}(\mathrm{J\,mol^{-1}\,K^{-1}})$	$\alpha^*_{p,i}(\mathrm{K^{-1}})$
Component	Exp.	Lit.	Lit.	Lit.
Hexane	0.6552	0.65484[a] 0.65516[b]	192.63[d]	0.00138[d]
Heptane	0.6796	0.67946[a] 0.6796[c]	230.42[d]	0.00126[d]
Octane	0.6986	0.69862[a]	254.69[d]	0.00111[d]
Nonane	0.7140	0.71375[a] 0.7140[c]	282.61[d]	0.00107[d]
Benzene	0.8736	0.87360[a]	137.86[d]	0.00114[d]
Toluene	0.8622	0.86219[a]	157.48[d]	0.00108[d]
Ethylbenzene	0.8625	0.86253[a]	183.58[d]	0.00100[d]

Note: [a]From reference [21], [b]reference [3], [c]reference [22], [d]reference [23].

To measure the refractive indices of pure components and their mixtures, an automatic refractometer (Abbemat-HP, Dr. Kernchen) with an uncertainty in the experimental measurements of $\pm 4 \times 10^{-5}$ was used.

3. Results and discussion

The experimental data of density, ρ, speed of sound, u, refractive index, n_D, isentropic compressibility, $K_{S,m}$, excess molar volume, V_m^E, excess molar isentropic compressibility, $K_{S,m}^E$, and refractive index deviation, Δn_D, for the binary systems (hexane (1), heptane (1), octane (1) or nonane (1) with benzene (2), toluene (2) or ethylbenzene (2)) at $T = 283.15$ and 298.15 K under atmospheric pressure are reported in the Appendix. The excess molar volumes and refractive index deviations were calculated by the following equations:

$$V_m^E = \sum_{i=1}^{N} x_i M_i \left(\rho^{-1} - \rho_i^{-1}\right) \tag{1}$$

$$\Delta n_D = n_D - \sum_{i}^{N} x_i n_{D,i}, \tag{2}$$

where ρ and ρ_i are the density of the mixture and the density of the pure components, respectively; x_i represents the mole fraction of the component i, and n_D and $n_{D,i}$ are the refractive index of the mixture and the pure component, respectively.

The speed of sound, u, is related to the isentropic compressibility, κ_s, by Laplace equation:

$$\kappa_s = -V_m^{-1}(\partial V_m/\partial p)_S = \rho^{-1}u^{-2} = V_m/\left(M_m u^2\right) \tag{3}$$

where, V_m is the molar volume, and M_m is the molar mass of the mixture and the pure components.

To achieve agreement with the other thermodynamic quantities, it is appropriate to shift from the volume-intensive κ_s to the mole-intensive quantity $K_{S,m}$ [24,25]:

$$K_{S,m} = -(\partial V_m/\partial p)_S = V_m \kappa_s = V_m^2/\left(M_m u^2\right), \tag{4}$$

where $K_{S,m}$ is the molar isentropic compressibility.

Experimental values for the speed of sound are reported in the Appendix, together with the derived values of isentropic compressibility and their excess, $K_{S,m}^E$. The excess molar isentropic compressibility, $K_{S,m}^E$, is calculated by the following equation:

$$K_{S,m}^E = K_{S,m} - K_{S,m}^{id}, \tag{5}$$

where $K_{S,m}^{id}$ is defined by the approach developed by Benson and Kiyohara [26]:

$$K_{S,m}^{id} = \sum_i x_i \left[K_{S,i}^* + T\frac{\left(E_{p,i}^*\right)^2}{C_{p,i}^*} \right] - T\left[\frac{\left(\sum_i x_i E_{p,i}^*\right)^2}{\sum_i x_i C_{p,i}^*} \right], \tag{6}$$

where $K^*_{S,i}$ is the product of the molar volume, V^*_i, and the isentropic compressibility, $\kappa^*_{S,i}$, of the pure component i. The molar isobaric expansion of pure component i, $E^*_{p,i}$, is the product of the molar volume and the isobaric expansibility $\alpha^*_{p,i}$ ($\alpha^*_{p,i} = -\frac{1}{\rho}(\frac{\partial \rho}{\partial T})_P$), and $C^*_{p,i}$ is the molar isobaric heat capacity of the pure component i. The values of $\alpha^*_{p,i}$ and $C^*_{p,i}$ were taken from literature [23] and these values are shown in Table 1 at $T = 298.15$ K.

The excess and deviation properties at the studied temperatures were fitted to a Redlich–Kister-type [27] equation:

$$\Delta Q_{12} = x_1 x_2 \sum_{p=0}^{M} B_p (x_1 - x_2)^p, \tag{7}$$

where ΔQ_{12} is the excess property, x_1 and x_2 are the mole fraction of components 1 and 2, respectively, B_p is the fitting parameter and M is the degree of the polynomic expansion. The fitting parameters are given in Tables 2 and 3 together with the root-mean-square deviations, σ, given by:

$$\sigma = \left\{ \sum_{i}^{n_{dat}} \left(z_{exp} - z_{calc}\right)^2 / n_{dat} \right\}^{1/2} \tag{8}$$

where z_{exp}, z_{calc} and n_{dat}, are the values of the experimental and calculated property and the number of experimental data, respectively.

Figures 1–3 show the fitted curves of the excess molar volumes, the refractive index deviation and the excess molar isentropic compressibility, respectively, of the studied binary systems containing alkanes (1) with aromatic compounds (2) at $T = 283.15$ and 298.15 K.

Figure 1(a)–(c) shows the excess molar volume for alkanes with benzene, toluene and ethylbenzene, respectively, at $T = 283.15$. Most parts of the systems present a similar behaviour for this physical property. As can be observed in this figure, excess molar volumes are positive over the entire composition range for all the investigated mixtures with a maximum between $x_1 = 0.4$ and $x_1 = 0.5$, except for the hexane (1) + toluene (2) and hexane (1) + ethylbenzene (2) binary systems which present a minimum about $x_1 = 0.5$. For all the studied systems containing lineal alkanes, when the aliphatic chain of the alkane increases the excess molar volume increases, and when the aliphatic chain and the methyl radical of the aromatic compounds increases, this excess property decreases. For comparison purposes the experimental data from Letcher [4] at $T = 283.15$ K are also presented in Figure 1(a).

Figure 2 shows the refractive index deviations for the studied systems over the entire composition range at $T = 298.15$ K. Figure 2(a)–(c) shows this deviation for alkanes with benzene, toluene and ethylbenzene, respectively. All studied systems present a similar behaviour for this physical property with small values of refractive index deviation. For this derived property, all systems present a minimum at approximately $x_1 = 0.4$ or $x_1 = 0.5$ and all they show is when the aliphatic chain of the alkane increases, the value of the refractive index deviation decreases. As in the excess molar volume case, for these systems, when the aliphatic chain and the methyl radical of the aromatic compounds increases, the refractive index decreases. The experimental data from Díaz *et al.* [14] at $T = 298.15$ K are also presented in Figure 2(c).

Table 2. Fitting parameters and root mean square deviations (σ) for binary mixtures at $T = 283.15$ K.

	B_0	B_1	B_2	B_3	σ
Hexane (1) + benzene (2)					
V^E (cm^3 mol^{-1})	1.6124	0.0884			0.007
Δn_D	−0.0587	0.0124	−0.0003		8×10^{-4}
$K^E_{S,m}$ (m^3 TPa^{-1} mol^{-1})	−0.0105	0.0036			5×10^{-5}
Heptane (1) + benzene(2)					
V^E (cm^3 mol^{-1})	2.2477	−0.4252	0.3172		0.008
Δn_D	−0.0069	0.0203	−0.0065		7×10^{-4}
$K^E_{S,m}$ (m^3 TPa^{-1} mol^{-1})	0.0009	0.0029			3×10^{-5}
Octane (1) + benzene (2)					
V^E (cm^3 mol^{-1})	2.8002	−0.4938	0.1721		0.009
Δn_D	−0.0779	0.0252			3×10^{-4}
$K^E_{S,m}$ (m^3 TPa^{-1} mol^{-1})	0.0082	0.0020			2×10^{-5}
Nonane (1) + benzene (2)					
V^E (cm^3 mol^{-1})	3.1975	−0.7641	0.1745	−0.0439	0.013
Δn_D	−0.0801	0.0325	−0.0126		9×10^{-4}
$K^E_{S,m}$ (m^3 TPa^{-1} mol^{-1})	0.0129	−0.0009			5×10^{-5}
Hexane (1) + toluene (2)					
V^E (cm^3 mol^{-1})	−0.2245	0.0394	−0.145		0.003
Δn_D	−0.0260	0.0028			1×10^{-4}
$K^E_{S,m}$ (m^3 TPa^{-1} mol^{-1})	−0.0198	−0.0008			7×10^{-5}
Heptane (1) + toluene (2)					
V^E (cm^3 mol^{-1})	0.5590	−0.0906			0.003
Δn_D	−0.0401	0.0072			3×10^{-5}
$K^E_{S,m}$ (m^3 TPa^{-1} mol^{-1})	−0.0079	0.0012			2×10^{-5}
Octane (1) + toluene (2)					
V^E (cm^3 mol^{-1})	0.8978	−0.2297			0.005
Δn_D	−0.0496	0.0104			1×10^{-4}
$K^E_{S,m}$ (m^3 TPa^{-1} mol^{-1})	−0.0010	0.0011			2×10^{-5}
Nonane (1) + toluene (2)					
V^E (cm^3 mol^{-1})	1.1611	−0.2859			0.006
Δn_D	−0.0547	0.0163			1×10^{-4}
$K^E_{S,m}$ (m^3 TPa^{-1} mol^{-1})	0.0035	0.0005			3×10^{-5}
Hexane (1) + ethylbenzene (2)					
V^E (cm^3 mol^{-1})	−0.6034	−0.0216	−0.2833		0.005
Δn_D	−0.0061	0.0013			6×10^{-5}
$K^E_{S,m}$ (m^3 TPa^{-1} mol^{-1})	−0.0245	−0.0034			6×10^{-5}
Heptane (1) + ethylbenzene (2)					
V^E (cm^3 mol^{-1})	0.2445	−0.0610	−0.1288		0.002
Δn_D	−0.0217	0.0021			5×10^{-5}
$K^E_{S,m}$ (m^3 TPa^{-1} mol^{-1})	−0.0122	−0.0001			4×10^{-5}
Octane (1) + ethylbenzene (2)					
V^E (cm^3 mol^{-1})	0.6621	−0.2754	−0.1255		0.004
Δn_D	−0.0330	0.0044			8×10^{-5}
$K^E_{S,m}$ (m^3 TPa^{-1} mol^{-1})	−0.0045	0.0004			2×10^{-5}
Nonane (1) + ethylbenzene (2)					
V^E (cm^3 mol^{-1})	1.0278	−0.1960	0.0584		0.004
Δn_D	−0.0396	0.0083			1×10^{-4}
$K^E_{S,m}$ (m^3 TPa^{-1} mol^{-1})	0.0007	0.0007			1×10^{-7}

Table 3. Fitting parameters and root mean square deviations (σ) for binary mixtures at $T = 298.15$ K.

	B_0	B_1	B_2	σ
	Hexane (1) + benzene (2)			
V^E ($cm^3\,mol^{-1}$)	1.5461	0.0460		0.006
Δn_D	−0.0580	0.0094		7×10^{-5}
$K^E_{S,m}$ ($m^3\,TPa^{-1}\,mol^{-1}$)	−0.0145	0.0047		5×10^{-5}
	Heptane (1) + benzene(2)			
V^E ($cm^3\,mol^{-1}$)	2.2425	−0.2342	0.4521	0.007
Δn_D	−0.0695	0.0188		2×10^{-4}
$K^E_{S,m}$ ($m^3\,TPa^{-1}\,mol^{-1}$)	0.0004	0.0015		2×10^{-5}
	Octane (1) + benzene (2)			
V^E ($cm^3\,mol^{-1}$)	2.7053	−0.5059	0.3533	0.008
Δn_D	−0.0750	0.0250		2×10^{-4}
$K^E_{S,m}$ ($m^3\,TPa^{-1}\,mol^{-1}$)	0.0086	0.0018		5×10^{-5}
	Nonane (1) + benzene (2)			
V^E ($cm^3\,mol^{-1}$)	3.1026	−0.8180	0.3651	0.009
Δn_D	−0.0773	0.0317	−0.0125	8×10^{-5}
$K^E_{S,m}$ ($m^3\,TPa^{-1}\,mol^{-1}$)	0.0152	0.0002		5×10^{-5}
	Hexane (1) + toluene (2)			
V^E ($cm^3\,mol^{-1}$)	−0.3702	0.0779		0.006
Δn_D	−0.0258	0.0019		3×10^{-5}
$K^E_{S,m}$ ($m^3\,TPa^{-1}\,mol^{-1}$)	−0.0262	0.0001		3×10^{-5}
	Heptane (1) + toluene (2)			
V^E ($cm^3\,mol^{-1}$)	0.6397	0.0294		0.007
Δn_D	−0.0392	0.0073		5×10^{-5}
$K^E_{S,m}$ ($m^3\,TPa^{-1}\,mol^{-1}$)	−0.0103	0.0023		2×10^{-5}
	Octane (1) + toluene (2)			
V^E ($cm^3\,mol^{-1}$)	0.9089	−0.1083		0.007
Δn_D	−0.0480	0.0116		8×10^{-5}
$K^E_{S,m}$ ($m^3\,TPa^{-1}\,mol^{-1}$)	−0.0023	0.0017		5×10^{-5}
	Nonane (1) + toluene (2)			
V^E ($cm^3\,mol^{-1}$)	1.4157	−0.2235	−0.0349	0.004
Δn_D	−0.0537	0.0160		1×10^{-4}
$K^E_{S,m}$ ($m^3\,TPa^{-1}\,mol^{-1}$)	0.0045	0.0014		4×10^{-5}
	Hexane (1) + ethylbenzene (2)			
V^E ($cm^3\,mol^{-1}$)	−0.6572	0.0325		0.005
Δn_D	−0.0061	0.0004		9×10^{-5}
$K^E_{S,m}$ ($m^3\,TPa^{-1}\,mol^{-1}$)	−0.0324	−0.0042		9×10^{-5}
	Heptane (1) + ethylbenzene (2)			
V^E ($cm^3\,mol^{-1}$)	0.2768	−0.0749	−0.1678	0.004
Δn_D	−0.0210	0.0024		8×10^{-5}
$K^E_{S,m}$ ($m^3\,TPa^{-1}\,mol^{-1}$)	−0.0161	0.0001		4×10^{-5}
	Octane (1) + ethylbenzene (2)			
V^E ($cm^3\,mol^{-1}$)	0.6889	−0.2639		0.004
Δn_D	−0.0316	0.0049		4×10^{-5}
$K^E_{S,m}$ ($m^3\,TPa^{-1}\,mol^{-1}$)	−0.0070	0.0002		4×10^{-5}
	Nonane (1) + ethylbenzene (2)			
V^E ($cm^3\,mol^{-1}$)	1.1294	−0.0604	0.1578	0.006
Δn_D	−0.0388	0.0077		8×10^{-5}
$K^E_{S,m}$ ($m^3\,TPa^{-1}\,mol^{-1}$)	0.0005	0.0023		4×10^{-5}

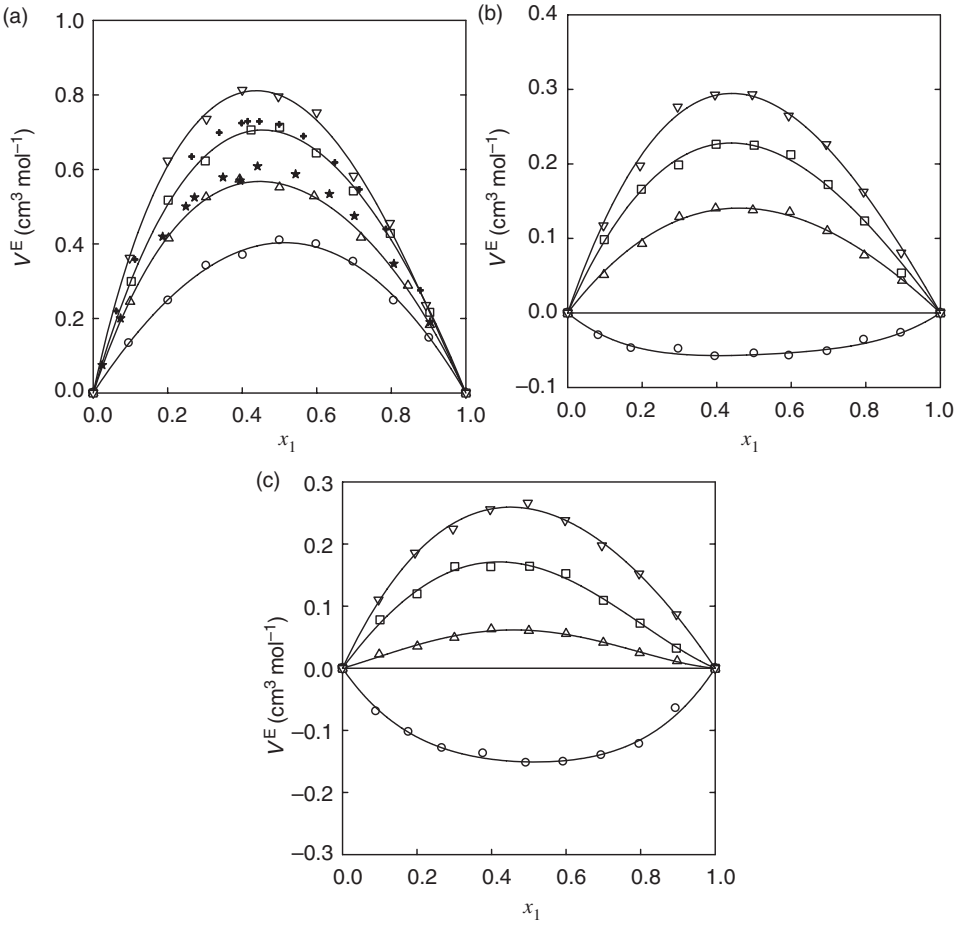

Figure 1. Excess molar volumes, V^E, plotted against mole fraction for the binary mixture alkane (1) + aromatic (2) at $T = 283.15$ K for: (a) benzene, (b) toluene and (c) ethylbenzene. Experimental data: ○ hexane, Δ heptane, □ octane, ▽ nonane. Literature data: ★ heptane, + octane from Letcher *et al.* [4]. Solid line: Redlich–Kister fitting.

The excess molar isentropic compressibilities are plotted in Figure 3 over the entire composition range at $T = 283.15$. Figure 3(a)–(c) shows the excess molar volume for alkanes with benzene, toluene and ethylbenzene. All studied systems present a behaviour very close to the ideality. As in the excess molar volume case, for all studied systems when the aliphatic chain of the alkane increases, the excess molar isentropic compressibility increases, but when the aliphatic chain and the methyl radical of the aromatic compounds increase this excess is more negative. The values of this property are negative for the binary systems hexane (1) + aromatic compounds (2), heptane (1) or octane (1) + toluene (2) and + ethylbenzene (2); partially negative for values lower than approximately $x_1 = 0.4$ for the system heptane (1) + benzene (2), and positive in the whole composition range for the other two systems (octane (1) + benzene (2) and nonane (1) + aromatic compounds (2)).

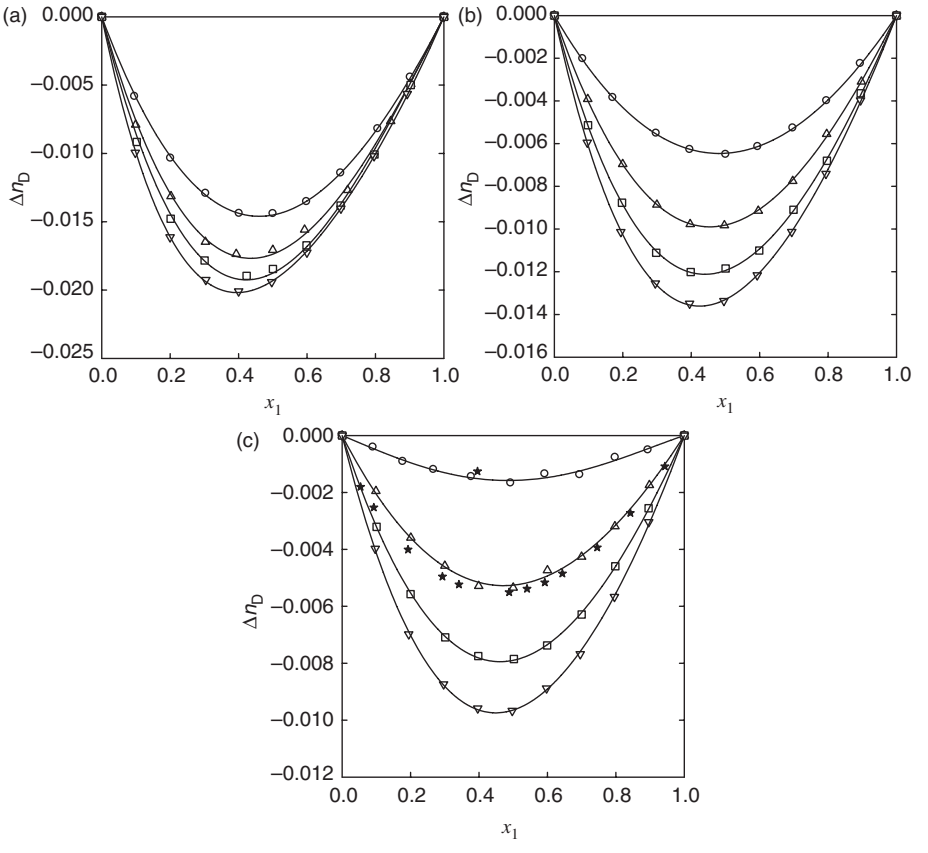

Figure 2. Refractive index deviations, Δn_D, plotted against mole fraction for the binary mixture alkane (1) + aromatic (2) at $T = 298.15$ K for: (a) benzene, (b) toluene and (c) ethylbenzene. Experimental data: ○ hexane, Δ heptane, □ octane, ∇ nonane. Literature data: ★ heptane from Díaz *et al.* [14]. Solid line: Redlich–Kister fitting.

4. Conclusions

Densities, speeds of sound and refractive index of binary systems hexane (1), heptane (1), octane (1) and nonane (1) with benzene (2), toluene (2) and ethylbenzene (2) at $T = 283.15$ and 298.15 K under atmospheric pressure over the whole composition range are presented in this article.

From experimental data for all binary systems, the excess properties (excess molar volume, refractive index deviations and excess molar isentropic compressibilities) have been determined and these data have been fitted to Redlich–Kister equation to test the quality of the experimental values and very good results are obtained.

Excess molar volumes are positive over the entire composition range for all the studied mixtures except for the hexane (1) + toluene (2) and hexane (1) + ethylbenzene (2) at both studied temperatures. For the refractive index deviations, all systems present negative values at studied temperatures. In the study of the excess molar isentropic compressibilities, it can be observed that the binary systems with nonane and the mixture octane (1) + benzene (2) present positive

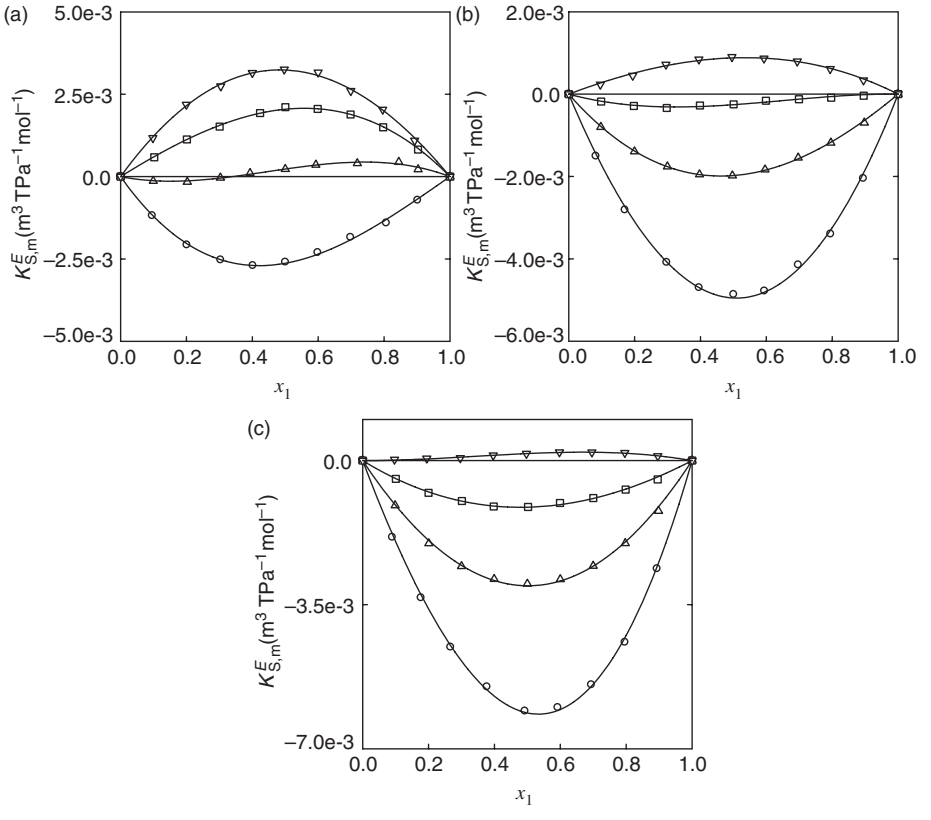

Figure 3. Excess molar isentropic compressibility, $K^{E}_{S,m}$, plotted against mole fraction for the binary mixture alkane (1) + aromatic (2) at $T = 283.15$ K for: (a) benzene, (b) toluene and (c) ethylbenzene. Experimental data: ○ hexane, Δ heptane, □ octane, ∇ nonane. Solid line: Redlich–Kister fitting.

values, the system heptane (1) + benzene (2) has a sigmoid behaviour, while that of the other studied systems have a negative trend. All studied systems present the values of excess molar isentropic compressibilities very close to zero for both studied temperatures.

It is possible to say that when the aliphatic chain of the alkane is higher, the excess molar volume and the excess molar isentropic compressibilities increase, but the refractive index deviations decrease; and when the aliphatic chain of the aromatic compound increases, the excess molar volume and the refractive index deviation decreases, but the excess molar isentropic compressibilities increase.

With the experimental data obtained in this article and the experimental data obtained in previous work [19], it can conclude that the temperature has scarce influence on these studied excess.

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Appendix

Table A1. Densities, ρ, speeds of sound, u, refractive indices, n_D, isentropic compressibilities, $K_{s,m}$, excess molar volumes, V_m^E, deviations in the refractive index, Δn_D, and excess molar isentropic compressibilities, $K_{S,m}^E$, of the binary mixtures alkanes (1) + aromatic compounds (2) at $T = 283.15$ K.

x_1	ρ (g cm^{-3})	n_D	u (m s^{-1})	$K_{S,m}$ (m^3 TPa^{-1} mol^{-1})	V^E (cm^3 mol^{-1})	Δn_D	$K_{S,m}^E$ (m^3 TPa^{-1} mol^{-1})
				Hexane (1) + benzene (2)			
0.0000	0.8895	1.50765	1371	0.05255	0.000	0.0000	0.00000
0.0965	0.8583	1.48932	1331	0.06049	0.133	−0.0061	−0.00119
0.2016	0.8276	1.47136	1294	0.06955	0.248	−0.0107	−0.00208
0.3042	0.8004	1.45561	1263	0.07880	0.341	−0.0134	−0.00253
0.4019	0.7770	1.44190	1239	0.08788	0.370	−0.0147	−0.00270
0.5009	0.7550	1.42940	1217	0.09735	0.409	−0.0146	−0.00260
0.5991	0.7351	1.41794	1198	0.10692	0.399	−0.0136	−0.00231
0.6988	0.7165	1.40744	1181	0.11682	0.352	−0.0114	−0.00185
0.8072	0.6980	1.39731	1167	0.12752	0.247	−0.0078	−0.00141
0.9021	0.6829	1.38867	1155	0.13719	0.148	−0.0044	−0.00072
1.0000	0.6685	1.38061	1145	0.14717	0.000	0.0000	0.00000
				Heptane (1) + benzene (2)			
0.0000	0.8895	1.50765	1371	0.05256	0.000	0.0000	0.00000
0.0993	0.8569	1.48831	1331	0.06175	0.245	−0.0080	−0.00013
0.2025	0.8278	1.47083	1299	0.07142	0.415	−0.0136	−0.00016
0.3029	0.8031	1.45643	1274	0.08098	0.526	−0.0165	−0.00004
0.3931	0.7834	1.44482	1256	0.08960	0.573	−0.0178	0.00010
0.5001	0.7630	1.43311	1239	0.09978	0.552	−0.0172	0.00023
0.5929	0.7469	1.42373	1227	0.10863	0.529	−0.0159	0.00036
0.7188	0.7276	1.41273	1214	0.12051	0.417	−0.0125	0.00040
0.8447	0.7104	1.40312	1204	0.13237	0.289	−0.0077	0.00044
0.9034	0.7032	1.39907	1200	0.13767	0.183	−0.0050	0.00022
1.0000	0.6921	1.39297	1195	0.14653	0.000	0.0000	0.00000
				Octane (1) + benzene (2)			
0.0000	0.8895	1.50765	1371	0.05255	0.000	0.0000	0.00000
0.1024	0.8559	1.48744	1332	0.06295	0.299	−0.0095	0.00059

(*continued*)

Table A1. Continued.

x_1	ρ (g cm^{-3})	n_D	u (m s^{-1})	$K_{S,m}$ (m^3 TPa^{-1} mol^{-1})	V^E (cm^3 mol^{-1})	Δn_D	$K^E_{S,m}$ (m^3 TPa^{-1} mol^{-1})
0.2013	0.8288	1.47128	1305	0.07298	0.518	−0.0153	0.00113
0.3006	0.8061	1.45773	1285	0.08289	0.623	−0.0184	0.00152
0.4234	0.7822	1.44362	1267	0.09508	0.706	−0.0197	0.00193
0.5001	0.7693	1.43607	1258	0.10260	0.713	−0.0192	0.00211
0.5985	0.7548	1.42775	1250	0.11198	0.644	−0.0172	0.00205
0.6982	0.7418	1.42028	1244	0.12137	0.542	−0.0143	0.00189
0.7972	0.7302	1.41361	1240	0.13047	0.428	−0.0106	0.00150
0.9031	0.7194	1.40751	1236	0.13994	0.217	−0.0056	0.00082
1.0000	0.7105	1.40294	1235	0.14842	0.000	0.0000	0.00000
				Nonane (1) + benzene (2)			
0.0000	0.8895	1.50765	1371	0.05255	0.000	0.0000	0.00000
0.0982	0.8568	1.48780	1335	0.06346	0.362	−0.0103	0.00118
0.1996	0.8298	1.47156	1310	0.07452	0.623	−0.0167	0.00219
0.3040	0.8076	1.45821	1294	0.08544	0.735	−0.0199	0.00274
0.4001	0.7903	1.44781	1284	0.09537	0.813	−0.0209	0.00315
0.4970	0.7757	1.43915	1277	0.10508	0.795	−0.0202	0.00325
0.5995	0.7623	1.43148	1271	0.11516	0.752	−0.0179	0.00316
0.6989	0.7515	1.42509	1269	0.12444	0.582	−0.0146	0.00260
0.7959	0.7419	1.41958	1267	0.13350	0.456	−0.0106	0.00203
0.8928	0.7337	1.41495	1267	0.14216	0.236	−0.0058	0.00110
1.0000	0.7255	1.41037	1267	0.15170	0.000	0.0000	0.00000
				Hexane (1) + toluene (2)			
0.0000	0.8761	1.50278	1371	0.06390	0.000	0.0000	0.00000
0.0830	0.8556	1.49053	1344	0.06931	−0.030	−0.0021	−0.00151
0.1713	0.8345	1.47800	1318	0.07535	−0.048	−0.0039	−0.00282
0.2980	0.8054	1.46058	1283	0.08463	−0.048	−0.0058	−0.00409
0.3960	0.7840	1.44823	1259	0.09217	−0.058	−0.0062	−0.00470
0.5011	0.7619	1.43501	1235	0.10076	−0.055	−0.0066	−0.00487

(*continued*)

Table A1. Continued.

x_1	ρ (g cm^{-3})	n_D	u (m s^{-1})	$K_{S,m}$ (m^3 TPa^{-1} mol^{-1})	V^E (cm^3 mol^{-1})	Δn_D	$K^E_{S,m}$ (m^3 TPa^{-1} mol^{-1})
0.5949	0.7430	1.42403	1215	0.10865	−0.058	−0.0061	−0.00478
0.6973	0.7231	1.41209	1195	0.11781	−0.052	−0.0055	−0.00415
0.7955	0.7047	1.40168	1178	0.12674	−0.036	−0.0039	−0.00340
0.8949	0.6868	1.39115	1162	0.13637	−0.027	−0.0023	−0.00205
1.0000	0.6685	1.38061	1145	0.14717	0.000	0.0000	0.00000
				Heptane (1) + toluene (2)			
0.0000	0.8761	1.50278	1371	0.06390	0.000	0.0000	0.00000
0.0974	0.8519	1.48800	1341	0.07115	0.051	−0.0041	−0.00080
0.1996	0.8284	1.47375	1315	0.07900	0.093	−0.0071	−0.00139
0.2997	0.8070	1.46084	1293	0.08690	0.129	−0.0090	−0.00176
0.3970	0.7877	1.44925	1273	0.09475	0.141	−0.0099	−0.00195
0.4970	0.7692	1.43822	1256	0.10299	0.138	−0.0100	−0.00198
0.5961	0.7520	1.42801	1241	0.11132	0.135	−0.0093	−0.00183
0.6967	0.7357	1.41841	1227	0.11992	0.110	−0.0079	−0.00154
0.7958	0.7206	1.40952	1215	0.12847	0.078	−0.0059	−0.00118
0.8973	0.7060	1.40104	1205	0.13735	0.043	−0.0032	−0.00069
1.0000	0.6921	1.39297	1195	0.14652	0.000	0.0000	0.00000
				Octane (1) + toluene (2)			
0.0000	0.8761	1.50278	1371	0.06391	0.000	0.0000	0.00000
0.0982	0.8517	1.48762	1343	0.07203	0.098	−0.0053	−0.00018
0.1977	0.8296	1.47399	1321	0.08033	0.166	−0.0090	−0.00029
0.2975	0.8097	1.46186	1303	0.08871	0.199	−0.0112	−0.00034
0.3983	0.7914	1.45075	1287	0.09729	0.226	−0.0123	−0.00027
0.5005	0.7746	1.44054	1274	0.10595	0.225	−0.0123	−0.00025
0.5988	0.7598	1.43166	1263	0.11435	0.212	−0.0113	−0.00016
0.6990	0.7460	1.42344	1254	0.12286	0.172	−0.0096	−0.00012
0.7966	0.7336	1.41605	1247	0.13114	0.124	−0.0072	−0.00009
0.8955	0.7220	1.40932	1240	0.13954	0.054	−0.0041	−0.00004
1.0000	0.7105	1.40294	1235	0.14842	0.000	0.0000	0.00000
				Nonane (1) + toluene (2)			
0.0000	0.8761	1.50278	1371	0.06391	0.000	0.0000	0.00000

(*continued*)

Table A1. Continued.

x_1	ρ (g cm^{-3})	n_D	u (m s^{-1})	$K_{S,m}$ (m^3 TPa^{-1} mol^{-1})	V^E (cm^3 mol^{-1})	Δn_D	$K^E_{S,m}$ (m^3 TPa^{-1} mol^{-1})
0.0960	0.8524	1.48777	1347	0.07257	0.117	−0.0061	0.00023
0.1942	0.8313	1.47464	1328	0.08141	0.198	−0.0102	0.00045
0.2952	0.8121	1.46273	1312	0.09054	0.276	−0.0128	0.00072
0.3954	0.7955	1.45242	1300	0.09946	0.293	−0.0138	0.00085
0.4954	0.7807	1.44343	1291	0.10830	0.293	−0.0136	0.00090
0.5929	0.7678	1.43561	1284	0.11683	0.264	−0.0124	0.00087
0.6939	0.7557	1.42831	1278	0.12562	0.226	−0.0103	0.00079
0.7939	0.7449	1.42196	1274	0.13422	0.162	−0.0075	0.00061
0.8947	0.7350	1.41598	1270	0.14279	0.081	−0.0041	0.00034
1.0000	0.7255	1.41037	1267	0.15170	0.000	0.0000	0.00000
				Hexane (1) + ethylbenzene (2)			
0.0000	0.8757	1.50129	1382	0.07246	0.000	0.0000	0.00000
0.0903	0.8564	1.48985	1356	0.07734	−0.070	−0.0005	−0.00186
0.1776	0.8377	1.47880	1332	0.08240	−0.103	−0.0011	−0.00333
0.2675	0.8186	1.46781	1308	0.08791	−0.129	−0.0012	−0.00453
0.3777	0.7953	1.45411	1280	0.09518	−0.137	−0.0016	−0.00550
0.4931	0.7713	1.44021	1252	0.10321	−0.153	−0.0016	−0.00609
0.5929	0.7507	1.42837	1229	0.11075	−0.151	−0.0014	−0.00600
0.6947	0.7299	1.41635	1207	0.11891	−0.140	−0.0011	−0.00545
0.7966	0.7093	1.40426	1186	0.12756	−0.122	−0.0009	−0.00441
0.8942	0.6896	1.39289	1166	0.13663	−0.065	−0.0005	−0.00263
1.0000	0.6685	1.38061	1145	0.14717	0.000	0.0000	0.00000
				Heptane (1) + ethylbenzene (2)			
0.0000	0.8757	1.50129	1382	0.07246	0.000	0.0000	0.00000
0.0987	0.8543	1.48845	1356	0.07868	0.022	−0.0021	−0.00109
0.2007	0.8331	1.47577	1331	0.08531	0.035	−0.0038	−0.00201
0.3001	0.8132	1.46411	1309	0.09212	0.050	−0.0047	−0.00257
0.3991	0.7941	1.45281	1288	0.09914	0.063	−0.0053	−0.00288
0.5001	0.7754	1.44161	1269	0.10651	0.061	−0.0055	−0.00299
0.5998	0.7576	1.43125	1252	0.11400	0.056	−0.0051	−0.00288

(*continued*)

Table A1. Continued.

x_1	ρ (g cm^{-3})	n_D	u (m s^{-1})	$K_{S,m}$ (m^3 TPa^{-1} mol^{-1})	V^E (cm^3 mol^{-1})	Δn_D	$K^E_{S,m}$ (m^3 TPa^{-1} mol^{-1})
0.6998	0.7404	1.42106	1236	0.12173	0.041	−0.0044	−0.00256
0.7973	0.7242	1.41161	1222	0.12950	0.025	−0.0033	−0.00201
0.8979	0.7080	1.40216	1208	0.13774	0.012	−0.0019	−0.00122
1.0000	0.6921	1.39297	1195	0.14653	0.000	0.0000	0.00000
				Octane (1) + ethylbenzene (2)			
0.0000	0.8757	1.50129	1382	0.07246	0.000	0.0000	0.00000
0.1007	0.8538	1.48798	1357	0.07967	0.078	−0.0034	−0.00044
0.2000	0.8338	1.47585	1336	0.08686	0.120	−0.0058	−0.00078
0.3013	0.8146	1.46431	1317	0.09436	0.164	−0.0074	−0.00098
0.3978	0.7976	1.45413	1301	0.10156	0.164	−0.0080	−0.00112
0.5019	0.7803	1.44377	1286	0.10945	0.164	−0.0082	−0.00113
0.5991	0.7651	1.43468	1273	0.11693	0.152	−0.0077	−0.00103
0.7000	0.7503	1.42593	1262	0.12471	0.109	−0.0065	−0.00091
0.7982	0.7366	1.41785	1252	0.13238	0.073	−0.0049	−0.00070
0.8956	0.7237	1.41029	1243	0.14002	0.032	−0.0029	−0.00046
1.0000	0.7105	1.40294	1235	0.14841	0.000	0.0000	0.00000
				Nonane (1) + ethylbenzene (2)			
0.0000	0.8757	1.50129	1382	0.07246	0.000	0.0000	0.00000
0.0966	0.8547	1.48834	1360	0.08014	0.110	−0.0042	0.00003
0.1946	0.8354	1.47649	1342	0.08793	0.186	−0.0071	0.00005
0.2965	0.8172	1.46542	1326	0.09601	0.224	−0.0089	0.00006
0.3964	0.8008	1.45543	1313	0.10400	0.256	−0.0098	0.00013
0.4972	0.7856	1.44619	1302	0.11203	0.266	−0.0099	0.00017
0.5973	0.7718	1.43792	1292	0.11999	0.238	−0.0091	0.00020
0.6959	0.7592	1.43039	1284	0.12780	0.198	−0.0076	0.00020
0.7957	0.7473	1.42324	1278	0.13570	0.152	−0.0057	0.00019
0.8960	0.7362	1.41652	1272	0.14357	0.087	−0.0033	0.00011
1.0000	0.7255	1.41037	1267	0.15170	0.000	0.0000	0.00000

Table A2. Densities, ρ, speeds of sound, u, refractive indices, n_D, isentropic compressibilities, $K_{s,m}$, excess molar volumes, V_m^E, deviations in the refractive index, Δn_D, and excess molar isentropic compressibilities, $K_{S,m}^E$, of the binary mixtures alkanes (1) + aromatic compounds (2) at $T = 298.15$ K.

x_1	ρ (g cm^{-3})	n_D	u (m s^{-1})	$K_{S,m}$ (m^3 TPa^{-1} mol^{-1})	V^E (cm^3 mol^{-1})	Δn_D	$K_{S,m}^E$ (m^3 TPa^{-1} mol^{-1})
				Hexane (1) + benzene (2)			
0.0000	0.8736	1.49774	1299	0.06063	0.000	0.0000	0.00000
0.0965	0.8428	1.47980	1261	0.06982	0.127	−0.0058	−0.00164
0.2016	0.8124	1.46211	1225	0.08045	0.247	−0.0104	−0.00281
0.3042	0.7856	1.44667	1195	0.09134	0.329	−0.0129	−0.00344
0.4019	0.7624	1.43294	1171	0.10207	0.367	−0.0144	−0.00369
0.5009	0.7408	1.42051	1150	0.11327	0.386	−0.0144	−0.00361
0.5991	0.7212	1.40908	1131	0.12465	0.365	−0.0135	−0.00325
0.6988	0.7027	1.39867	1115	0.13651	0.337	−0.0114	−0.00258
0.8072	0.6844	1.38832	1100	0.14932	0.236	−0.0082	−0.00195
0.9021	0.6694	1.38018	1088	0.16102	0.152	−0.0044	−0.00091
1.0000	0.6552	1.37234	1077	0.17292	0.000	0.0000	0.00000
				Heptane (1) + benzene (2)			
0.0000	0.8736	1.49774	1299	0.06064	0.000	0.0000	0.00000
0.0993	0.8417	1.47866	1262	0.07116	0.234	−0.0079	−0.00031
0.2025	0.8131	1.46181	1232	0.08237	0.405	−0.0131	−0.00037
0.3029	0.7888	1.44716	1208	0.09343	0.520	−0.0165	−0.00026
0.3931	0.7695	1.43612	1190	0.10347	0.557	−0.0174	−0.00007
0.5001	0.7493	1.42437	1174	0.11531	0.558	−0.0171	0.00009
0.5929	0.7335	1.41540	1162	0.12564	0.530	−0.0156	0.00029
0.7188	0.7144	1.40412	1149	0.13955	0.441	−0.0127	0.00046
0.8447	0.6975	1.39500	1139	0.15333	0.310	−0.0076	0.00049
0.9034	0.6904	1.39110	1135	0.15961	0.209	−0.0049	0.00037
1.0000	0.6796	1.38515	1130	0.16979	0.000	0.0000	0.00000
				Octane (1) + benzene (2)			
0.0000	0.8736	1.49774	1299	0.06063	0.000	0.0000	0.00000
0.1024	0.8408	1.47808	1264	0.07244	0.301	−0.0092	0.00057
0.2013	0.8144	1.46231	1239	0.08392	0.511	−0.0148	0.00119

(*continued*)

Table A2. Continued.

x_1	ρ (g cm^{-3})	n_D	u (m s^{-1})	$K_{S,m}$ (m^3 TPa^{-1} mol^{-1})	V^E (cm^3 mol^{-1})	Δn_D	$K^E_{S,m}$ (m^3 TPa^{-1} mol^{-1})
0.3006	0.7922	1.44907	1220	0.09528	0.618	−0.0178	0.00164
0.4234	0.7689	1.43535	1203	0.10925	0.690	−0.0190	0.00214
0.5001	0.7565	1.42799	1195	0.11770	0.660	−0.0185	0.00216
0.5985	0.7420	1.41963	1187	0.12854	0.643	−0.0167	0.00220
0.6982	0.7293	1.41233	1181	0.13926	0.535	−0.0138	0.00198
0.7972	0.7180	1.40592	1177	0.14967	0.409	−0.0101	0.00152
0.9031	0.7073	1.40013	1174	0.16058	0.222	−0.0050	0.00081
1.0000	0.6986	1.39519	1172	0.17042	0.000	0.0000	0.00000
				Nonane (1) + benzene (2)			
0.0000	0.8736	1.49774	1299	0.06063	0.000	0.0000	0.00000
0.0982	0.8419	1.47852	1267	0.07294	0.357	−0.0099	0.00130
0.1996	0.8158	1.46275	1245	0.08539	0.598	−0.0161	0.00240
0.3040	0.7941	1.44977	1230	0.09786	0.722	−0.0193	0.00316
0.4001	0.7773	1.43984	1220	0.10913	0.793	−0.0201	0.00366
0.4970	0.7630	1.43137	1213	0.12024	0.787	−0.0194	0.00391
0.5995	0.7501	1.42384	1209	0.13147	0.713	−0.0173	0.00365
0.6989	0.7394	1.41767	1207	0.14208	0.575	−0.0140	0.00313
0.7959	0.7300	1.41234	1206	0.15233	0.457	−0.0102	0.00250
0.8928	0.7219	1.40774	1206	0.16219	0.260	−0.0057	0.00150
1.0000	0.7140	1.40326	1207	0.17270	0.000	0.0000	0.00000
				Hexane (1) + toluene (2)			
0.0000	0.8622	1.49399	1305	0.07282	0.000	0.0000	0.00000
0.0830	0.8417	1.48187	1279	0.07911	−0.032	−0.0020	−0.00203
0.1713	0.8207	1.46930	1252	0.08624	−0.065	−0.0038	−0.00373
0.2980	0.7917	1.45222	1218	0.09720	−0.078	−0.0055	−0.00545
0.3960	0.7703	1.43954	1193	0.10624	−0.082	−0.0063	−0.00622
0.5011	0.7484	1.42652	1169	0.11640	−0.101	−0.0065	−0.00658
0.5949	0.7295	1.41548	1149	0.12607	−0.095	−0.0061	−0.00630
0.6973	0.7096	1.40389	1129	0.13706	−0.075	−0.0053	−0.00556
0.7961	0.6911	1.39315	1111	0.14830	−0.045	−0.0040	−0.00421

(*continued*)

Table A2. Continued.

x_1	ρ (g cm^{-3})	n_D	u (m s^{-1})	$K_{S,m}$ (m^3 TPa^{-1} mol^{-1})	V^E (cm^3 mol^{-1})	Δn_D	$K^E_{S,m}$ (m^3 TPa^{-1} mol^{-1})
0.8946	0.6734	1.38291	1094	0.15995	−0.022	−0.0023	−0.00242
1.0000	0.6552	1.37234	1077	0.17292	0.000	0.0000	0.00000
				Heptane (1) + Toluene (2)			
0.0000	0.8622	1.49399	1305	0.07282	0.000	0.0000	0.00000
0.0974	0.8381	1.47947	1277	0.08117	0.058	−0.0039	−0.00109
0.1996	0.8148	1.46531	1251	0.09028	0.093	−0.0070	−0.00189
0.2997	0.7935	1.45252	1228	0.09953	0.137	−0.0089	−0.00234
0.3970	0.7743	1.44101	1209	0.10875	0.156	−0.0098	−0.00256
0.4970	0.7559	1.43007	1192	0.11843	0.161	−0.0098	−0.00258
0.5961	0.7389	1.41996	1177	0.12824	0.149	−0.0091	−0.00237
0.6967	0.7227	1.41041	1163	0.13837	0.131	−0.0078	−0.00200
0.7958	0.7077	1.40183	1151	0.14849	0.105	−0.0055	−0.00149
0.8973	0.6932	1.39323	1140	0.15909	0.079	−0.0031	−0.00073
1.0000	0.6796	1.38515	1130	0.16977	0.000	0.0000	0.00000
				Octane (1) + toluene (2)			
0.0000	0.8622	1.49399	1305	0.07283	0.000	0.0000	0.00000
0.0982	0.8381	1.47915	1279	0.08206	0.097	−0.0051	−0.00036
0.1977	0.8163	1.46569	1258	0.09156	0.160	−0.0088	−0.00056
0.2975	0.7966	1.45348	1240	0.10123	0.198	−0.0111	−0.00063
0.3983	0.7786	1.44262	1224	0.11108	0.212	−0.0120	−0.00062
0.5005	0.7619	1.43269	1211	0.12114	0.228	−0.0118	−0.00053
0.5988	0.7473	1.42382	1201	0.13082	0.212	−0.0110	−0.00044
0.6990	0.7336	1.41583	1192	0.14072	0.185	−0.0091	−0.00032
0.7966	0.7213	1.40848	1184	0.15037	0.148	−0.0068	−0.00019
0.8955	0.7099	1.40187	1178	0.16000	0.066	−0.0036	−0.00022
1.0000	0.6986	1.39519	1172	0.17042	0.000	0.0000	0.00000
				Nonane (1) + toluene (2)			
0.0000	0.8622	1.49399	1305	0.07283	0.000	0.0000	0.00000
0.0960	0.8387	1.47933	1282	0.08267	0.143	−0.0060	0.00026

(*continued*)

Table A2. Continued.

x_1	ρ (g cm^{-3})	n_D	u (m s^{-1})	$K_{S,m}$ (m^3 TPa^{-1} mol^{-1})	V^E (cm^3 mol^{-1})	Δn_D	$K^E_{S,m}$ (m^3 TPa^{-1} mol^{-1})
0.1942	0.8179	1.46623	1264	0.09276	0.232	−0.0101	0.00053
0.2952	0.7990	1.45466	1249	0.10313	0.316	−0.0125	0.00082
0.3954	0.7826	1.44463	1238	0.11333	0.347	−0.0135	0.00101
0.4954	0.7680	1.43568	1229	0.12345	0.358	−0.0134	0.00114
0.5929	0.7553	1.42803	1222	0.13329	0.334	−0.0122	0.00124
0.6939	0.7435	1.42090	1216	0.14320	0.276	−0.0101	0.00106
0.7939	0.7329	1.41455	1212	0.15293	0.208	−0.0074	0.00081
0.8947	0.7232	1.40884	1209	0.16268	0.117	−0.0040	0.00049
1.0000	0.7140	1.40326	1207	0.17270	0.000	0.0000	0.00000
				Hexane (1) + ethylbenzene (2)			
0.0000	0.8625	1.49304	1318	0.08210	0.000	0.0000	0.00000
0.0903	0.8431	1.48173	1293	0.08782	−0.068	−0.0004	−0.00249
0.1776	0.8243	1.47068	1269	0.09383	−0.099	−0.0009	−0.00440
0.2675	0.8052	1.45955	1245	0.10038	−0.135	−0.0012	−0.00601
0.3777	0.7819	1.44600	1216	0.10907	−0.153	−0.0014	−0.00733
0.4931	0.7578	1.43186	1188	0.11888	−0.157	−0.0017	−0.00800
0.5929	0.7372	1.42012	1165	0.12797	−0.155	−0.0014	−0.00797
0.6947	0.7164	1.40781	1141	0.13806	−0.141	−0.0014	−0.00713
0.7984	0.6954	1.39590	1120	0.14874	−0.106	−0.0008	−0.00587
0.8942	0.6762	1.38460	1099	0.15993	−0.063	−0.0005	−0.00338
1.0000	0.6552	1.37234	1077	0.17292	0.000	0.0000	0.00000
				Heptane (1) + ethylbenzene (2)			
0.0000	0.8625	1.49304	1318	0.08209	0.000	0.0000	0.00000
0.0987	0.8412	1.48043	1293	0.08924	0.016	−0.0020	−0.00151
0.2007	0.8199	1.46779	1268	0.09709	0.050	−0.0036	−0.00260
0.3001	0.8001	1.45608	1246	0.10501	0.056	−0.0046	−0.00340
0.3991	0.7811	1.44469	1226	0.11325	0.063	−0.0053	−0.00384
0.5001	0.7624	1.43374	1206	0.12198	0.072	−0.0053	−0.00397
0.5998	0.7447	1.42359	1189	0.13085	0.063	−0.0047	−0.00384
0.6998	0.7276	1.41328	1173	0.14004	0.046	−0.0043	−0.00342

(*continued*)

Table A2. Continued.

x_1	ρ (g cm^{-3})	n_D	u (m s^{-1})	$K_{S,m}$ (m^3 TPa^{-1} mol^{-1})	V^E (cm^3 mol^{-1})	Δn_D	$K^E_{S,m}$ (m^3 TPa^{-1} mol^{-1})
0.7973	0.7115	1.40383	1158	0.14940	0.026	−0.0032	−0.00261
0.8979	0.6954	1.39442	1144	0.15926	0.012	−0.0017	−0.00157
1.0000	0.6796	1.38515	1130	0.16979	0.000	0.0000	0.00000
				Octane (1) + ethylbenzene (2)			
0.0000	0.8625	1.49304	1318	0.08210	0.000	0.0000	0.00000
0.1007	0.8407	1.47997	1295	0.09030	0.086	−0.0032	−0.00070
0.2000	0.8208	1.46790	1274	0.09858	0.135	−0.0056	−0.00118
0.3013	0.8018	1.45647	1255	0.10723	0.170	−0.0071	−0.00148
0.3978	0.7849	1.44636	1239	0.11557	0.176	−0.0077	−0.00167
0.5019	0.7678	1.43607	1224	0.12472	0.165	−0.0079	−0.00172
0.5991	0.7527	1.42704	1212	0.13342	0.158	−0.0074	−0.00160
0.7000	0.7380	1.41826	1200	0.14247	0.119	−0.0063	−0.00145
0.7982	0.7244	1.41034	1190	0.15147	0.087	−0.0046	−0.00113
0.8956	0.7116	1.40285	1181	0.16047	0.050	−0.0026	−0.00074
1.0000	0.6986	1.39519	1172	0.17043	0.000	0.0000	0.00000
				Nonane (1) + ethylbenzene (2)			
0.0000	0.8625	1.49304	1318	0.08210	0.000	0.0000	0.00000
0.0966	0.8417	1.48039	1298	0.09073	0.120	−0.0040	−0.00012
0.1946	0.8226	1.46859	1280	0.09961	0.198	−0.0070	−0.00011
0.2965	0.8046	1.45768	1264	0.10886	0.237	−0.0087	−0.00010
0.3964	0.7884	1.44787	1252	0.11803	0.265	−0.0096	0.00002
0.4972	0.7733	1.43873	1241	0.12726	0.290	−0.0097	0.00011
0.5973	0.7596	1.43053	1232	0.13638	0.274	−0.0089	0.00016
0.6959	0.7471	1.42289	1224	0.14539	0.244	−0.0077	0.00024
0.7957	0.7354	1.41594	1217	0.15458	0.185	−0.0057	0.00039
0.8960	0.7245	1.40955	1211	0.16352	0.103	−0.0030	0.00023
1.0000	0.7140	1.40326	1207	0.17271	0.000	0.0000	0.00000