

## **ELECTRONIC SUPPLEMENTARY INFORMATION**

concerning the paper entitled

### **Refractive indices, molar volumes and molar refractions of binary liquid mixtures: concepts and correlations**

by Pilar Brocos, Ángel Piñeiro<sup>a</sup>, Ramón Bravo and Alfredo Amigo

Departamento de Física Aplicada, Facultad de Física,  
Universidad de Santiago de Compostela, E-15782 Santiago de Compostela, Spain

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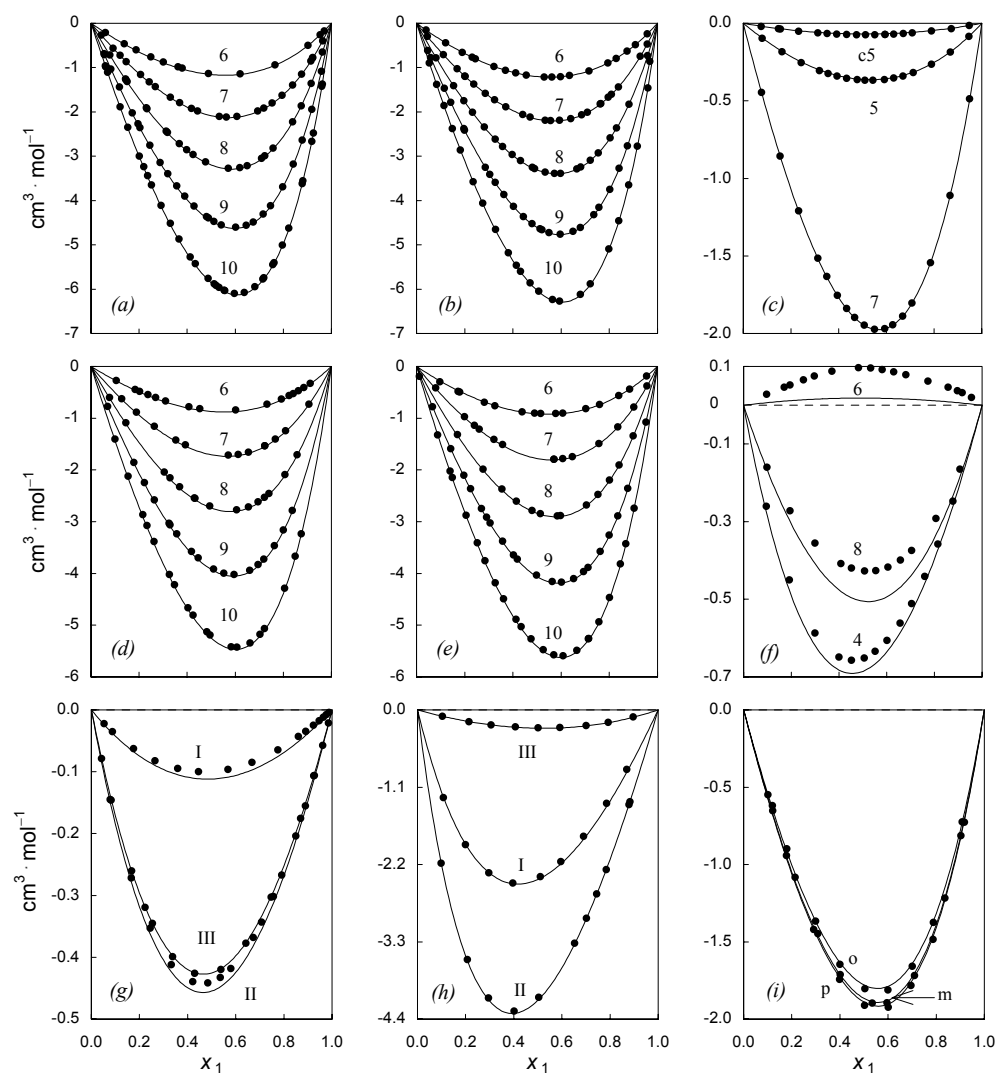
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<sup>a</sup> Current address: Laboratorio de Termofísica, Facultad de Química,  
Universidad Nacional Autónoma de México, México D.F. 04510, Mexico

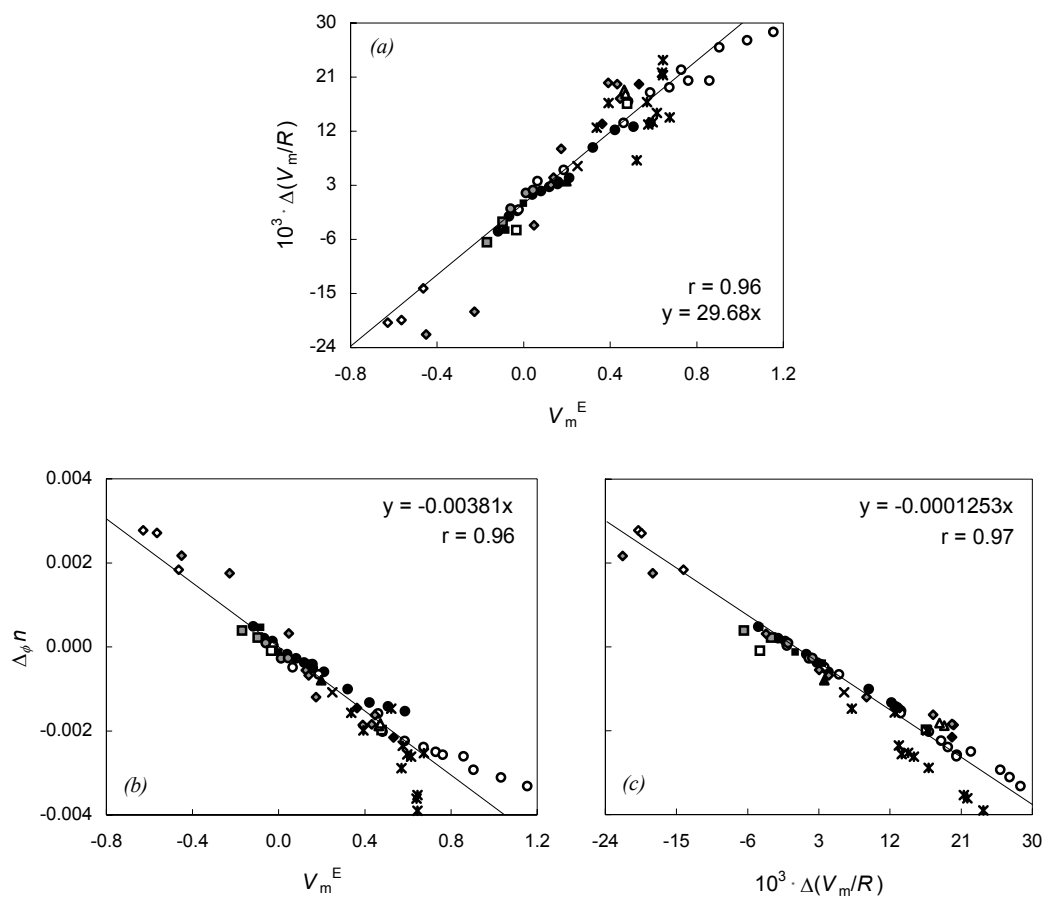
**Table S1.** Comparison of  $\Delta_v R$  (eq. 3) and  $\Delta_\phi R$  (eq. 4) at 298.15 K and equimolar fraction for several binary mixtures.<sup>a</sup>

System	$\Delta_v R$	$\Delta_\phi R$
	$\text{cm}^3 \cdot \text{mol}^{-1}$	$\text{cm}^3 \cdot \text{mol}^{-1}$
THF + hexane	0.0179	-1.14
1-hexanol	0.0008	-1.20
heptane	0.0157	-2.07
1-heptanol	0.0057	-2.16
2-heptanone	0.0012	-1.94
octane	0.0144	-3.18
1-octanol	0.0088	-3.30
nonane	0.0246	-4.44
1-nonanol	0.0102	-4.60
decane	0.0313	-5.82
1-decanol	0.0162	-6.01
1,4-dioxane + hexane	0.0276	-0.84
1-hexanol	0.0080	-0.91
heptane	0.0247	-1.68
1-heptanol	0.0130	-1.77
2-heptanone	0.0071	-1.57
octane	0.0276	-2.71
1-octanol	0.0179	-2.82
nonane	0.0353	-3.89
1-nonanol	0.0194	-4.04
decane	0.0379	-5.21
1-decanol	0.0323	-5.38
cyclohexane + hexane <sup>b</sup>	0.0038	-0.101
benzene <sup>c</sup>	0.0142	-0.059
toluene <sup>c</sup>	0.0199	0.035

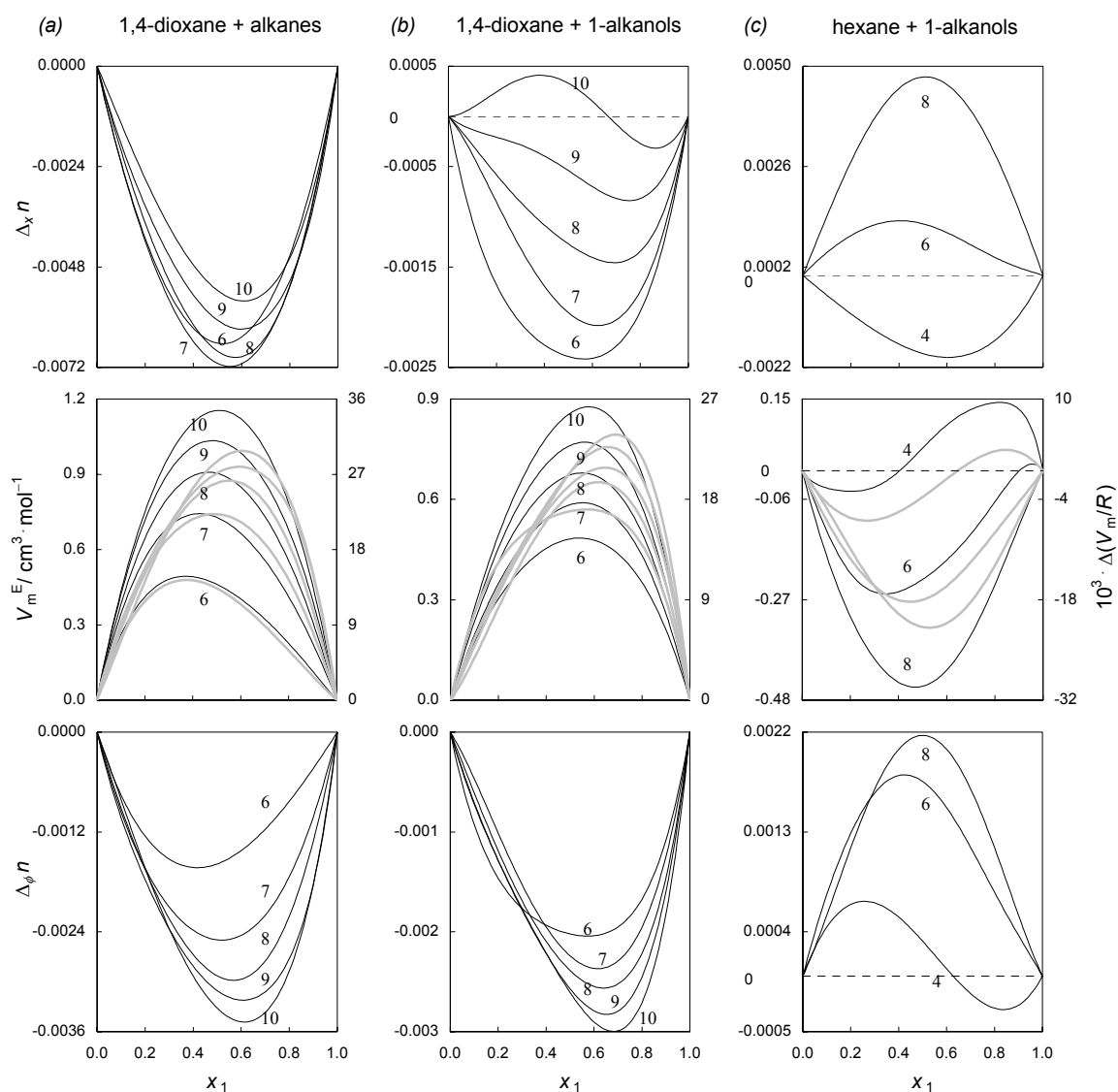
<sup>a</sup> References are given in Table 2 unless otherwise indicated.<sup>b</sup> Refs. 5, 49.<sup>c</sup> Refs. 5, 50.



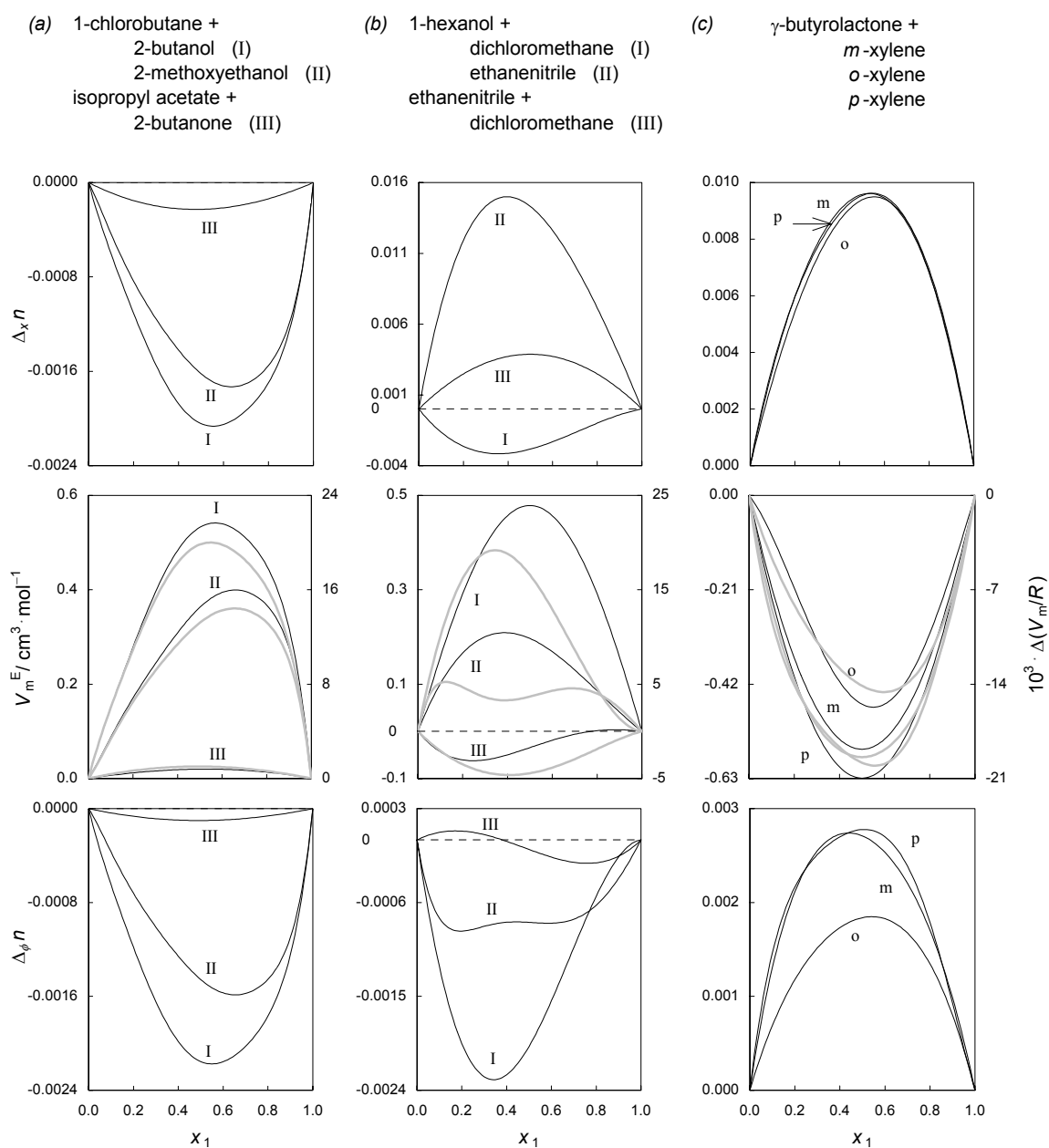
**Fig. S1.** Comparison of  $\Delta\phi R$  [dots, eq. 4] and  $(\Delta\phi R - \Delta xR)$  [lines, eq. 15] at 298.15 K for the following binary systems: (a), {THF + alkanes}; (b), {THF + 1-alkanols}; (c), {THF + ketones}; (d), {1,4-dioxane + alkanes}; (e), {1,4-dioxane + 1-alkanols}; (f), {hexane + 1-alkanols}; (g), {1-chlorobutane + 2-butanol or + 2-methoxyethanol} and {isopropyl acetate + 2-butanone}; (h), {1-hexanol + dichloromethane or + ethanenitrile} and {ethanenitrile + dichloromethane}; and (i),  $\{\gamma$ -butyrolactone + *m*-xylene or + *o*-xylene or + *p*-xylene}. Labels have the same meaning as in Figs. 2, S3 and S4, and references are given in Table 2.



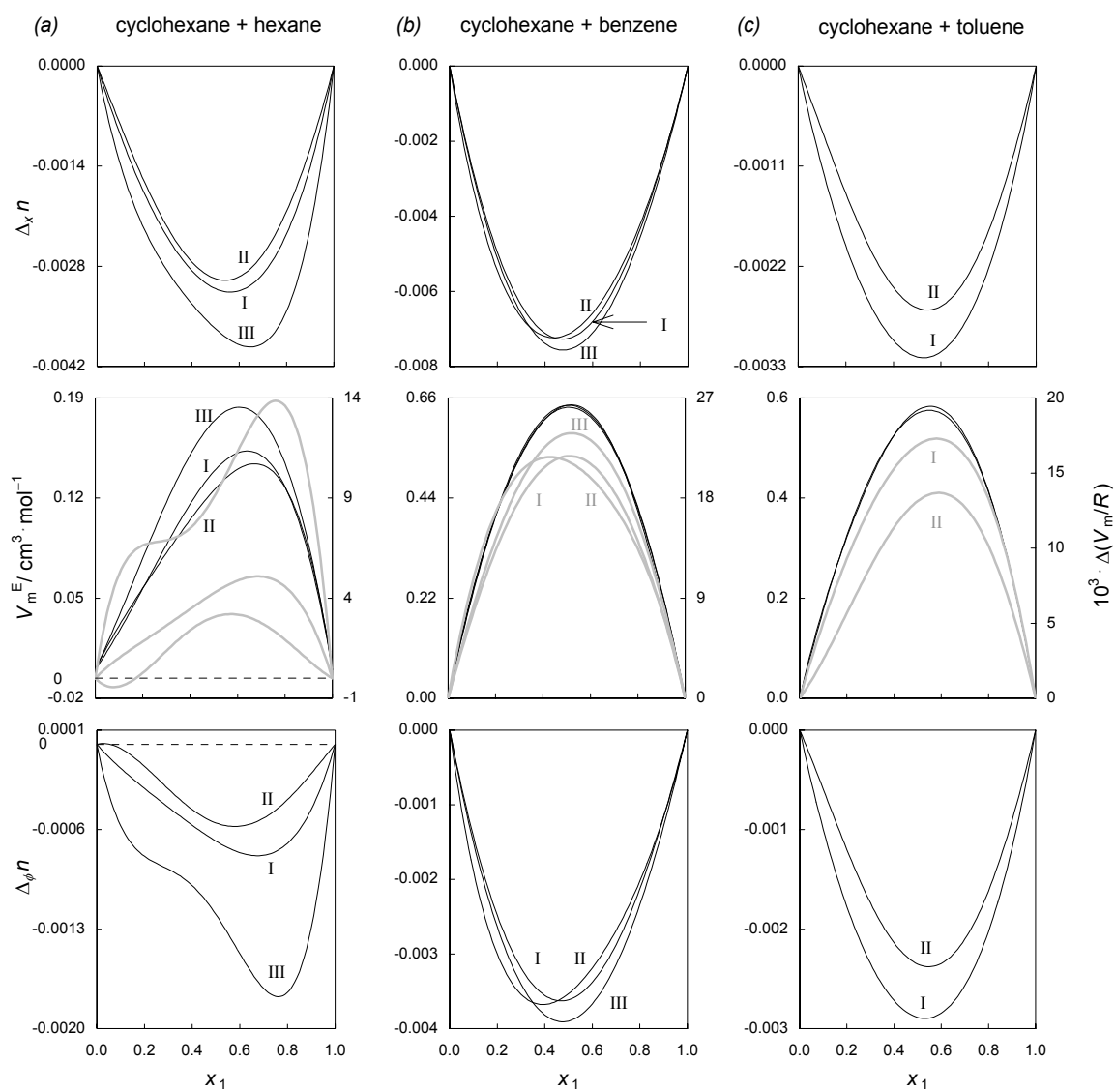
**Fig. S2.** Correlation at equimolar fraction between (a)  $\Delta(V_m/R)$  and  $V_m^E$ , (b)  $\Delta\phi n$  and  $V_m^E$ , and (c)  $\Delta\phi n$  and  $\Delta(V_m/R)$ , for all the binary systems listed in Table 2. Symbols match with the labels in the first column of that table in the following manner: 1, black circle; 2, white circle; 3, grey circle; 4, black square; 5, white square; 6, grey square; 7, black diamond; 8, white diamond; 9, grey diamond; 10, black triangle; 11, white triangle; 12, star; 13, cross.



**Fig. S3.** Plots of  $\Delta_x n$  (eq. 2),  $V_m^E$ , and  $\Delta_\phi n$  (eq. 1) at 298.15 K for some sets of binary systems.  $\Delta(V_m/R)$  (eq. 16) is represented by grey lines and referred to the axis on the right. Labels stand for the number of carbon atoms in the second component of the mixture. References are given in Table 2.



**Fig. S4.** Plots of  $\Delta_{x_1} n$  (eq. 2),  $V_m^E$ , and  $\Delta_{\phi} n$  (eq. 1) for some sets of binary systems.  $\Delta(V_m/R)$  (eq. 16) is represented by grey lines and referred to the axis on the right.  $T=298.15$  K unless otherwise indicated. In (a) I-II,  $T=313.15$  K; in (a) III,  $T=303.15$  K. References are given in Table 2.



**Fig. S5.** Plots of  $\Delta_x n$  (eq. 2),  $V_m^E$ , and  $\Delta_\phi n$  (eq. 1) at 298.15 K for three binary systems using different data sources.  $\Delta(V_m/R)$  (eq. 16) is represented by grey lines and referred to the axis on the right. (a): I, refs. 5, 49; II, ref. 17; III, ref. 60. (b): I, refs. 5, 50; II, ref. 66; III, ref. 14. (c): I, refs. 5, 50; II, ref. 65.