

**Excess/deviation properties of binary mixtures of 2,5-dimethylfuran with  
furfuryl alcohol, methyl isobutyl ketone, 1-butanol, and 2-butanol at  
temperature range of (293.15 to 323.15) K**

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**Table S1.** Excess molar volume,  $V_m^E$  and deviation in isentropic compressibility,  $\Delta\kappa_s$ , for the binary systems { 2,5-dimethylfuran (2,5-DMF) + furfuryl alcohol (FA) or Methyl isobutyl ketone (MIBK) or 1-butanol, or 2-butanol } at (293.15, 303.15, 313.15K and 323.15) K and at  $p = 1 \times 10^5$  Pa.

$x_1$	293.15K		303.15K		313.15K		323.15K	
	$V_m^E$ ( $10^3 \text{ m}^3 \cdot \text{mol}^{-1}$ )	$\Delta\kappa_s$ ( $10^{12} \times \text{Pa}^{-1}$ )	$V_m^E$ ( $10^3 \text{ m}^3 \cdot \text{mol}^{-1}$ )	$\Delta\kappa_s$ ( $10^{12} \times \text{Pa}^{-1}$ )	$V_m^E$ ( $10^3 \text{ m}^3 \cdot \text{mol}^{-1}$ )	$\Delta\kappa_s$ ( $10^{12} \times \text{Pa}^{-1}$ )	$V_m^E$ ( $10^3 \text{ m}^3 \cdot \text{mol}^{-1}$ )	$\Delta\kappa_s$ ( $10^{12} \times \text{Pa}^{-1}$ )
<b>{ 2,5-DMF (1) + FA (2) }</b>								
0.0000	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
0.0996	-0.141	-3.04	-0.152	-4.44	-0.164	-6.12	-0.175	-8.17
0.1996	-0.205	-3.75	-0.225	-6.14	-0.244	-9.05	-0.264	-12.66
0.2964	-0.245	-2.93	-0.269	-5.93	-0.294	-9.72	-0.319	-14.41
0.4031	-0.269	-1.01	-0.295	-4.40	-0.322	-8.99	-0.349	-14.09
0.4954	-0.266	1.16	-0.292	-2.33	-0.318	-6.77	-0.344	-12.44
0.5973	-0.239	3.85	-0.263	0.51	-0.288	-3.92	-0.311	-9.53
0.7022	-0.201	5.34	-0.219	2.25	-0.239	-1.91	-0.256	-7.11
0.7916	-0.141	5.59	-0.152	2.87	-0.164	-0.70	-0.177	-5.33
0.9004	-0.070	3.28	-0.072	1.11	-0.073	-1.47	-0.073	-4.47
1.0000	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
<b>{ 2,5-DMF (1) + MIBK (2) }</b>								
0.0000	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
0.1015	-0.089	-2.57	-0.088	-2.70	-0.088	-2.71	-0.086	-2.73
0.2002	-0.158	-4.53	-0.156	-4.70	-0.154	-4.79	-0.152	-4.91
0.3044	-0.211	-6.23	-0.208	-6.44	-0.205	-6.52	-0.201	-6.59
0.3976	-0.237	-7.05	-0.233	-7.28	-0.229	-7.37	-0.224	-7.46
0.5000	-0.237	-6.96	-0.233	-7.11	-0.229	-7.15	-0.222	-7.13
0.6004	-0.216	-6.42	-0.210	-6.47	-0.204	-6.43	-0.197	-6.30
0.6779	-0.221	-6.19	-0.216	-6.30	-0.212	-6.29	-0.206	-6.24
0.7885	-0.156	-4.23	-0.152	-4.25	-0.147	-4.12	-0.142	-3.96
0.8536	-0.045	-2.97	-0.042	-2.95	-0.039	-2.77	-0.036	-2.56
0.9276	-0.108	-1.00	-0.104	-0.94	-0.100	-0.79	-0.095	-0.65
1.0000	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00

***{2,5-DMF (1) + 1-butanol (2)}***

0.0000	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
0.1053	0.005	5.06	0.017	6.44	0.031	7.96	0.047	9.68
0.2013	0.023	9.66	0.044	11.93	0.068	14.60	0.097	17.58
0.3027	0.053	14.04	0.082	17.13	0.115	20.72	0.155	24.71
0.3969	0.081	17.70	0.115	21.32	0.155	25.46	0.202	30.05
0.5099	0.110	20.81	0.149	24.72	0.193	29.12	0.244	33.92
0.6051	0.142	22.58	0.181	26.36	0.227	30.56	0.279	35.10
0.6947	0.156	22.59	0.194	25.93	0.237	29.50	0.288	33.33
0.7944	0.158	20.30	0.191	22.66	0.230	25.08	0.275	27.58
0.8938	0.138	14.01	0.163	14.85	0.192	15.50	0.226	16.25
1.0000	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00

***{2,5-DMF (1) + 2-butanol (2)}***

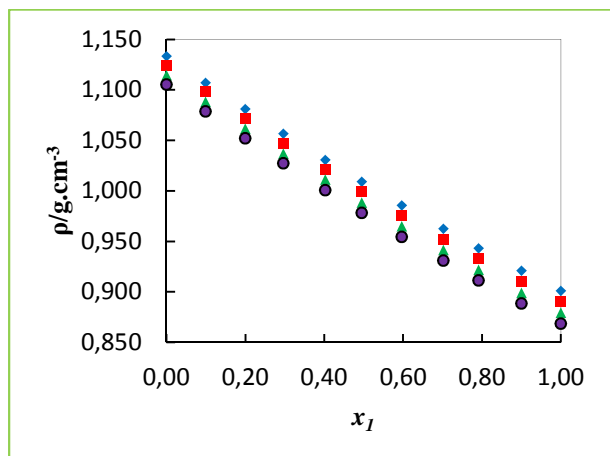
0.0000	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
0.1033	0.096	8.73	0.127	11.19	0.160	14.05	0.192	17.03
0.1972	0.185	15.87	0.238	19.98	0.291	24.59	0.344	29.40
0.2955	0.273	22.36	0.339	27.61	0.407	33.32	0.474	39.25
0.392	0.338	26.84	0.412	32.57	0.486	38.68	0.560	45.00
0.5124	0.398	30.27	0.473	35.80	0.549	41.58	0.625	47.53
0.5938	0.411	30.56	0.482	35.52	0.555	40.67	0.630	46.06
0.686	0.395	28.47	0.460	32.52	0.527	36.74	0.598	41.08
0.7963	0.346	23.22	0.399	25.83	0.456	28.52	0.516	31.38
0.8957	0.259	14.66	0.296	15.59	0.335	16.63	0.375	17.93
1.0000	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00

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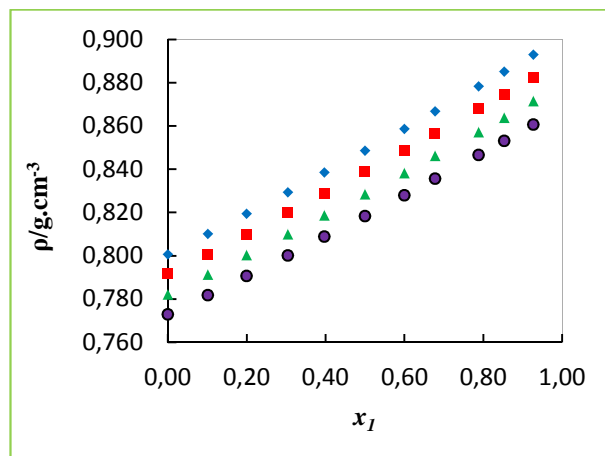
Standard uncertainties  $u$  are  $u(T) = \pm 0.02$  K,  $u(p) = \pm 0.04$  MPa and the combined expanded uncertainty  $U_c$  in mole fraction, density and sound velocity were  $U_c(x) = \pm 0.0005$ ,  $U_c(\rho) = \pm 0.003$  g.cm<sup>-3</sup> and  $U_c(u) = \pm 1.2$  m.s<sup>-1</sup>, respectively, (0.95 level of confidence).

**Figure S1.** Plot of density for the binary mixtures:(a){2,5-DMF (1) + FA (2)}.(b){2,5-DMF (1) + MIBK (2)}.(c) {2,5-DMF (1) + 1-butanol (2)} and (d){2,5-DMF (1) + 2-butanol (2)} as function of the composition expressed in the mole fraction of 2,5-DMF at 293.15 K ( $\diamond$ ), 303.15 K ( $\square$ ), 313.15 K ( $\blacktriangle$ ), and 323.15 K ( $\bullet$ ).

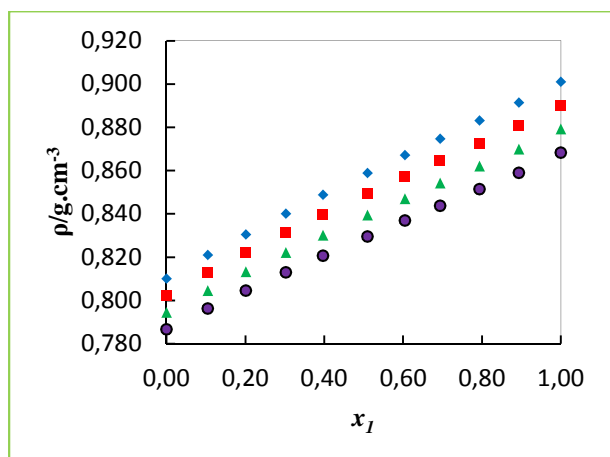
**Figure 1 (a)**



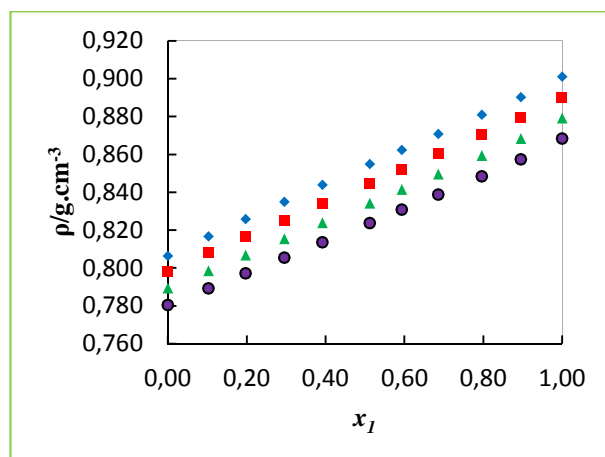
**Figure 1 (b)**



**Figure 1 (c)**

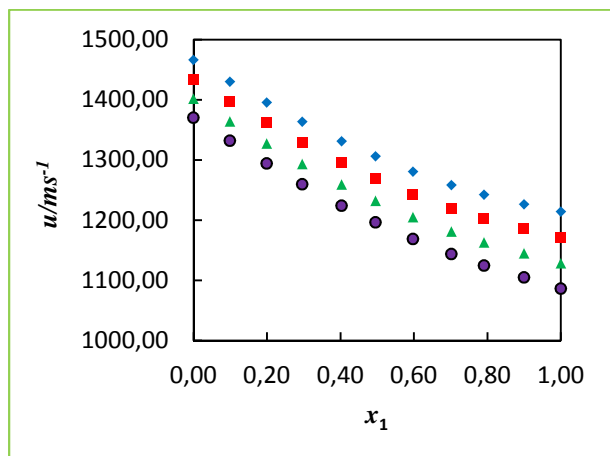


**Figure 1 (d)**

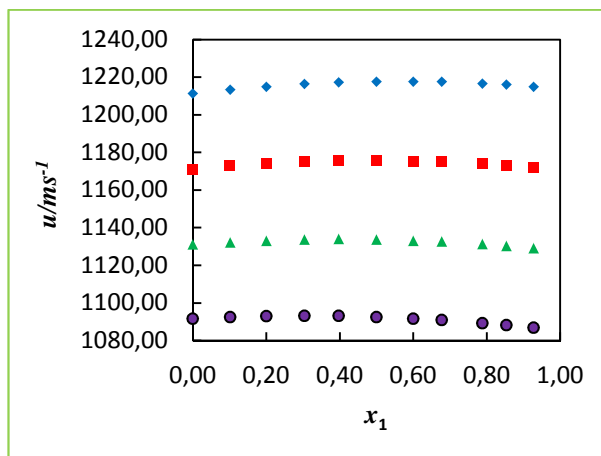


**Figure S2.** Plot of sound velocity for the binary mixtures:(a){2,5-DMF (1) + FA (2)}.(b){2,5-DMF (1) + MIBK (2)}.(c) {2,5-DMF (1) + 1-butanol (2)} and (d){2,5-DMF (1) + 2-butanol (2)} as function of the composition expressed in the mole fraction of 2,5-DMF at 293.15 K ( $\blacklozenge$ ), 303.15 K ( $\blacksquare$ ), 313.15 K ( $\blacktriangle$ ), and 323.15 K ( $\bullet$ ).

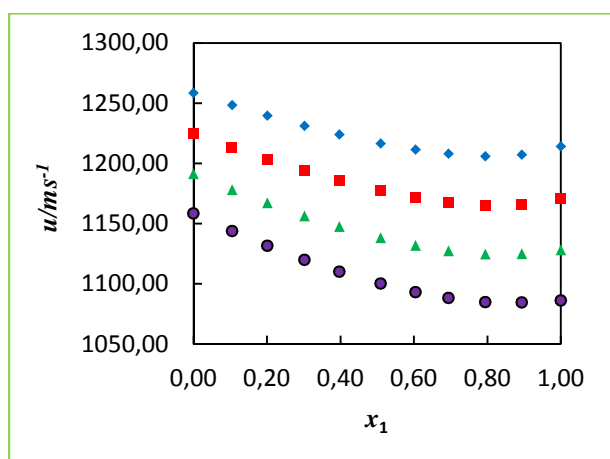
**Figure 1 (a)**



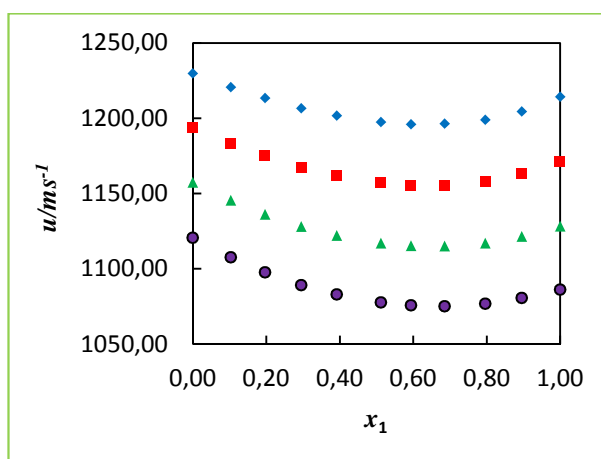
**Figure 1 (b)**



**Figure 1 (c)**

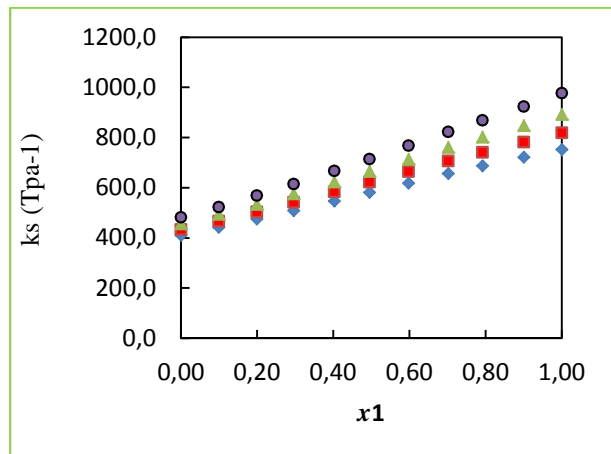


**Figure 1 (d)**

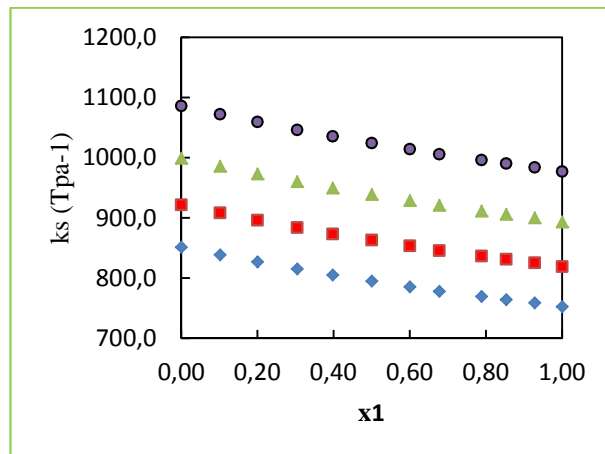


**Figure S3.** Plot of isentropic compressibility for the binary mixtures:(a){2,5-DMF (1) + FA (2)}.(b){2,5-DMF (1) + MIBK (2)}.(c) {2,5-DMF (1) + 1-butanol (2)} and (d){2,5-DMF (1) + 2-butanol (2)} as function of the composition expressed in the mole fraction of 2,5-DMF at 293.15 K ( $\blacklozenge$ ), 303.15 K ( $\blacksquare$ ), 313.15 K ( $\blacktriangle$ ), and 323.15 K ( $\bullet$ ).\*

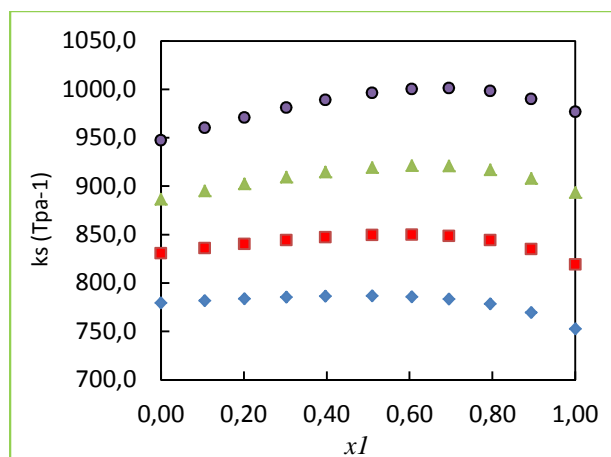
**Figure 1 (a)**



**Figure 1 (b)**



**Figure 1 (c)**



**Figure 1 (d)**

