



SUPPLEMENTARY MATERIAL TO
**Experimental study of the thermodynamic and transport
properties of binary mixtures of poly(ethylene glycol) diacrylate
and alcohols at different temperatures**

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TABLE S-I. Experimental data of densities, ρ , viscosities, η , and refractive indices, n_D , of PEGDA + alcohol binary mixtures in the temperature range 288.15 to 323.15 K and at atmospheric pressure; standard uncertainties, σ , for each variables are $\sigma(T) = 0.01$ K; $\sigma(p) = 5$ %; $\sigma(x_1) = \pm 1 \times 10^{-4}$, and the combined uncertainties, σ_c , are $\sigma_c(\rho) = \pm 1 \times 10^{-2}$ kg m⁻³; $\sigma_c(n_D) = \pm 1 \times 10^{-4}$; $\sigma_c(\eta) = 0.35$ %, at the 0.95 level of confidence ($k \approx 2$)

x_1	$\rho / 10^3$ kg m ⁻³	$\eta /$ mPa s	n_D	x_1	$\rho / 10^3$ kg m ⁻³	$\eta /$ mPa s	n_D
PEGDA (1) + ethanol (2)							
T=288.15 K							
0.0000	0.793813	1.3056	1.36397	0.5001	1.106579	87.166	1.46472
0.0513	0.926776	5.8557	1.40385	0.6010	1.112252	106.30	1.46611
0.1000	0.983459	10.549	1.41928	0.7000	1.115287	123.85	1.46785
0.2000	1.045931	26.970	1.44576	0.8047	1.120624	141.33	1.46973
0.3000	1.076323	46.252	1.45522	0.9000	1.123135	156.85	1.47038
0.3987	1.096773	66.690	1.46170	1.0000	1.126811	173.59	1.47212
T=293.15 K							
0.0000	0.789547	1.1885	1.36193	0.5001	1.102063	66.525	1.46273
0.0513	0.922428	5.0933	1.40241	0.6010	1.104806	80.078	1.46414
0.1000	0.979024	8.9407	1.41755	0.7000	1.110772	92.609	1.46586
0.2000	1.041435	21.752	1.44371	0.8047	1.116127	104.99	1.46777
0.3000	1.071807	36.608	1.45316	0.9000	1.118635	115.54	1.46841
0.3987	1.092253	51.720	1.45971	1.0000	1.122337	127.08	1.47012
T=298.15 K							
0.0000	0.785257	1.0838	1.35999	0.5001	1.097558	51.880	1.46079
0.0513	0.918001	4.5238	1.40010	0.6010	1.100298	61.948	1.46218
0.1000	0.974586	7.6692	1.41581	0.7000	1.106269	71.074	1.46390
0.2000	1.036939	18.299	1.44168	0.8047	1.111629	79.932	1.46582

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TABLE S-I. Continued

x_1	$\rho / 10^3 \text{ kg m}^{-3}$	$\eta / \text{mPa s}$	n_D	x_1	$\rho / 10^3 \text{ kg m}^{-3}$	$\eta / \text{mPa s}$	n_D
PEGDA (1) + ethanol (2)							
$T=298.15 \text{ K}$							
0.3000	1.067296	29.548	1.45114	0.9000	1.114147	87.385	1.46646
0.3987	1.087741	40.997	1.45774	1.0000	1.117853	95.723	1.46814
$T=303.15 \text{ K}$							
0.0000	0.780942	0.98999	1.35789	0.5001	1.093060	41.531	1.45886
0.0513	0.913586	3.9406	1.39785	0.6010	1.095805	49.098	1.46024
0.1000	0.970141	6.6501	1.41351	0.7000	1.101780	55.811	1.46198
0.2000	1.032449	15.069	1.43963	0.8047	1.107149	62.283	1.46390
0.3000	1.062797	24.263	1.44913	0.9000	1.109663	67.850	1.46454
0.3987	1.083240	33.127	1.45579	1.0000	1.113381	73.921	1.46618
$T=308.15 \text{ K}$							
0.0000	0.776592	0.90491	1.35581	0.5001	1.088575	33.790	1.45697
0.0513	0.909154	3.5103	1.39558	0.6010	1.091325	39.595	1.45834
0.1000	0.965685	5.8188	1.41166	0.7000	1.097304	44.693	1.46007
0.2000	1.027959	12.895	1.43761	0.8047	1.102683	49.630	1.46198
0.3000	1.058302	20.223	1.44719	0.9000	1.105191	53.833	1.46263
0.3987	1.078750	27.218	1.45385	1.0000	1.108930	58.351	1.46424
$T=313.15 \text{ K}$							
0.0000	0.772202	0.82807	1.35359	0.5001	1.084103	27.893	1.45506
0.0513	0.904645	3.1239	1.39380	0.6010	1.086860	32.496	1.45645
0.1000	0.961219	5.1336	1.40966	0.7000	1.092842	36.521	1.45818
0.2000	1.023472	11.052	1.43564	0.8047	1.098227	40.430	1.46005
0.3000	1.053814	17.079	1.44527	0.9000	1.100743	43.452	1.46070
0.3987	1.074270	22.701	1.45188	1.0000	1.104486	46.952	1.46228
$T=318.15 \text{ K}$							
0.0000	0.767765	0.75816	1.35137	0.5001	1.079643	23.316	1.45311
0.0513	0.900167	2.8255	1.39126	0.6010	1.082406	27.038	1.45452
0.1000	0.956736	4.5616	1.40763	0.7000	1.088392	30.252	1.45625
0.2000	1.018982	9.7554	1.43364	0.8047	1.093790	33.272	1.45810
0.3000	1.049334	14.592	1.44332	0.9000	1.096306	35.627	1.45875
0.3987	1.069794	19.179	1.44992	1.0000	1.100066	38.428	1.46031
$T=323.15 \text{ K}$							
0.0000	0.763276	0.69427	1.34857	0.5001	1.075189	19.865	1.45115
0.0513	0.895623	2.5022	1.38954	0.6010	1.077900	22.948	1.45255
0.1000	0.952239	4.0812	1.40565	0.7000	1.083956	25.534	1.45430
0.2000	1.014492	8.3221	1.43175	0.8047	1.089367	28.002	1.45616
0.3000	1.044856	12.573	1.44141	0.9000	1.091885	29.940	1.45679
0.3987	1.065333	16.414	1.44798	1.0000	1.095664	32.136	1.45839
PEGDA (1) + 1-propanol (2)							
$T=288.15 \text{ K}$							
0.0000	0.807931	2.4573	1.38736	0.4997	1.094608	83.644	1.46362
0.0508	0.910173	6.8564	1.41324	0.5994	1.106090	103.07	1.46616

TABLE S-I. Continued

x_1	$\rho / 10^3 \text{ kg m}^{-3}$	$\eta / \text{mPa s}$	n_D	x_1	$\rho / 10^3 \text{ kg m}^{-3}$	$\eta / \text{mPa s}$	n_D
PEGDA (1) + 1-propanol (2)							
$T=288.15 \text{ K}$							
0.1001	0.966543	11.958	1.42624	0.7004	1.113163	122.69	1.46781
0.1999	1.026686	26.654	1.44562	0.7993	1.118460	140.20	1.46984
0.2999	1.060564	43.501	1.45426	0.8997	1.123611	156.67	1.47074
0.3999	1.081882	63.061	1.45967	1.0000	1.126811	173.59	1.47212
$T=293.15 \text{ K}$							
0.0000	0.803946	2.1677	1.38537	0.4997	1.090116	63.947	1.46154
0.0508	0.905986	5.8703	1.41132	0.5994	1.101596	77.818	1.46416
0.1001	0.962254	9.9488	1.42455	0.7004	1.108661	91.694	1.46580
0.1999	1.022280	21.508	1.44358	0.7993	1.113970	103.89	1.46780
0.2999	1.056101	34.414	1.45224	0.8997	1.119120	115.28	1.46872
0.3999	1.077403	48.937	1.45766	1.0000	1.122337	127.08	1.47012
$T=298.15 \text{ K}$							
0.0000	0.799932	1.9222	1.38334	0.4997	1.085631	50.051	1.45958
0.0508	0.901723	5.1015	1.40923	0.5994	1.097111	60.253	1.46217
0.1001	0.957954	8.4345	1.42243	0.7004	1.104169	70.063	1.46383
0.1999	1.017874	17.773	1.44158	0.7993	1.109480	78.986	1.46578
0.2999	1.051646	27.756	1.45022	0.8997	1.114632	87.332	1.46674
0.3999	1.072926	38.983	1.45568	1.0000	1.117853	95.723	1.46814
$T=303.15 \text{ K}$							
0.0000	0.795891	1.7158	1.38129	0.4997	1.081162	39.980	1.45755
0.0508	0.897515	4.4556	1.40636	0.5994	1.092633	47.665	1.46017
0.1001	0.953651	7.2395	1.41998	0.7004	1.099690	55.018	1.46183
0.1999	1.013476	14.846	1.43958	0.7993	1.105010	61.588	1.46379
0.2999	1.047200	22.769	1.44822	0.8997	1.110155	67.786	1.46478
0.3999	1.068469	31.451	1.45369	1.0000	1.113381	73.921	1.46618
$T=308.15 \text{ K}$							
0.0000	0.791813	1.5385	1.37920	0.4997	1.076708	32.517	1.45552
0.0508	0.893236	3.9118	1.40526	0.5994	1.088171	38.441	1.45818
0.1001	0.949333	6.2755	1.41821	0.7004	1.095224	44.168	1.45985
0.1999	1.009075	12.540	1.43754	0.7993	1.100550	49.114	1.46180
0.2999	1.042761	18.960	1.44623	0.8997	1.105693	53.720	1.46280
0.3999	1.064015	25.848	1.45170	1.0000	1.108930	58.351	1.46424
$T=313.15 \text{ K}$							
0.0000	0.787692	1.3883	1.37704	0.4997	1.072259	26.872	1.45352
0.0508	0.888949	3.4626	1.40145	0.5994	1.083716	31.531	1.45618
0.1001	0.945001	5.4866	1.41625	0.7004	1.090767	35.991	1.45787
0.1999	1.004673	10.738	1.43557	0.7993	1.096100	39.818	1.45981
0.2999	1.038323	15.999	1.44423	0.8997	1.101241	43.408	1.46083
0.3999	1.059571	21.579	1.44972	1.0000	1.104486	46.952	1.46228
$T=318.15 \text{ K}$							
0.0000	0.783522	1.2614	1.37488	0.4997	1.067823	22.516	1.45152
0.0508	0.884636	3.0840	1.40099	0.5994	1.079281	26.251	1.45421
0.1001	0.940651	4.8338	1.41433	0.7004	1.086327	29.806	1.45590

TABLE S-I. Continued

x_1	$\rho / 10^3 \text{ kg m}^{-3}$	$\eta / \text{mPa s}$	n_D	x_1	$\rho / 10^3 \text{ kg m}^{-3}$	$\eta / \text{mPa s}$	n_D
$T=318.15 \text{ K}$							
0.1999	1.000264	9.2867	1.43345	0.7993	1.091670	32.821	1.45787
0.2999	1.033890	13.657	1.44221	0.8997	1.096809	35.637	1.45886
0.3999	1.055137	18.230	1.44773	1.0000	1.100066	38.428	1.46031
PEGDA (1) + 1-propanol (2)							
$T=323.15 \text{ K}$							
0.0000	0.779300	1.1488	1.37278	0.4997	1.063402	19.229	1.44960
0.0508	0.880283	2.7763	1.39895	0.5994	1.074854	22.290	1.45230
0.1001	0.936280	4.3193	1.41215	0.7004	1.081897	25.165	1.45397
0.1999	0.995856	8.1572	1.43161	0.7993	1.087250	27.604	1.45593
0.2999	1.029459	11.865	1.44037	0.8997	1.092388	29.862	1.45695
0.3999	1.050706	15.672	1.44579	1.0000	1.095664	32.136	1.45839
PEGDA (1) + 1-butanol (2)							
$T=288.15 \text{ K}$							
0.0000	0.814002	3.3696	1.40128	0.5001	1.089122	77.514	1.46339
0.0539	0.903840	7.4289	1.42152	0.5996	1.100203	97.184	1.46579
0.1001	0.951448	11.632	1.43202	0.6994	1.109189	116.70	1.46774
0.2001	1.013127	24.426	1.44631	0.7993	1.116370	136.23	1.46956
0.2998	1.052143	40.317	1.45495	0.8999	1.122425	155.26	1.47075
0.4004	1.071754	58.088	1.45951	1.0000	1.126811	173.59	1.47212
$T=293.15 \text{ K}$							
0.0000	0.810205	2.9321	1.39929	0.5001	1.084661	59.498	1.46135
0.0539	0.899778	6.3500	1.41946	0.5996	1.095730	73.674	1.46380
0.1001	0.947302	9.6960	1.42996	0.6994	1.104713	87.498	1.46574
0.2001	1.008822	19.843	1.44429	0.7993	1.111886	101.16	1.46756
0.2998	1.047757	31.996	1.45293	0.8999	1.117939	114.38	1.46875
0.4004	1.067325	45.291	1.45747	1.0000	1.122337	127.08	1.47012
$T=298.15 \text{ K}$							
0.0000	0.806384	2.5656	1.39725	0.5001	1.080219	46.442	1.45931
0.0539	0.895739	5.4714	1.41745	0.5996	1.091271	57.220	1.46181
0.1001	0.943150	8.1956	1.42805	0.6994	1.100243	67.356	1.46376
0.2001	1.004523	16.358	1.44230	0.7993	1.107405	77.233	1.46557
0.2998	1.043376	25.815	1.45090	0.8999	1.113458	86.707	1.46679
0.4004	1.062912	35.881	1.45545	1.0000	1.117853	95.723	1.46814
$T=303.15 \text{ K}$							
0.0000	0.802538	2.2518	1.39519	0.5001	1.075785	37.439	1.45727
0.0539	0.891646	4.7591	1.41549	0.5996	1.086830	45.133	1.45986
0.1001	0.938991	7.0189	1.42615	0.6994	1.095781	53.032	1.46183
0.2001	1.000228	13.723	1.44034	0.7993	1.102943	60.318	1.46360
0.2998	1.039005	21.259	1.44887	0.8999	1.108986	67.299	1.46484
0.4004	1.058505	29.260	1.45346	1.0000	1.113381	73.921	1.46618
$T=308.15 \text{ K}$							
0.0000	0.798659	1.9916	1.39313	0.5001	1.071366	30.535	1.45531
0.0539	0.887569	4.1658	1.41344	0.5996	1.082394	36.714	1.45794

TABLE S-I. Continued

x_1	$\rho / 10^3 \text{ kg m}^{-3}$	$\eta / \text{mPa s}$	n_D	x_1	$\rho / 10^3 \text{ kg m}^{-3}$	$\eta / \text{mPa s}$	n_D
PEGDA (1) + 1-butanol (2)							
$T=303.15 \text{ K}$							
0.1001	0.934817	6.0799	1.42421	0.6994	1.091340	42.535	1.45994
0.2001	0.995932	11.646	1.43839	0.7993	1.098489	48.162	1.46164
0.2998	1.034639	17.787	1.44686	0.8999	1.104531	53.427	1.46292
0.4004	1.054110	24.131	1.45150	1.0000	1.108930	58.351	1.46424
$T=313.15 \text{ K}$							
0.0000	0.794741	1.7672	1.39101	0.5001	1.066960	25.296	1.45332
0.0539	0.883452	3.6706	1.41141	0.5996	1.077973	30.180	1.45600
0.1001	0.930633	5.3106	1.42224	0.6994	1.086915	34.775	1.45805
0.2001	0.991636	9.9944	1.43639	0.7993	1.094056	39.138	1.45967
0.2998	1.030279	15.050	1.44486	0.8999	1.100089	43.191	1.46097
0.4004	1.049725	20.185	1.44956	1.0000	1.104486	46.952	1.46228
$T=318.15 \text{ K}$							
0.0000	0.790780	1.5735	1.38890	0.5001	1.062560	21.251	1.45134
0.0539	0.879316	3.2526	1.40939	0.5996	1.073564	25.181	1.45404
0.1001	0.926432	4.6740	1.42023	0.6994	1.082498	28.828	1.45610
0.2001	0.987335	8.6592	1.43438	0.7993	1.089636	32.293	1.45771
0.2998	1.025922	12.883	1.44288	0.8999	1.095662	35.484	1.45900
0.4004	1.045348	17.097	1.44760	1.0000	1.100066	38.428	1.46031
$T=323.15 \text{ K}$							
0.0000	0.786774	1.4177	1.38683	0.5001	1.058173	18.188	1.44940
0.0539	0.875197	2.9182	1.40739	0.5996	1.069171	21.403	1.45217
0.1001	0.922213	4.1743	1.41831	0.6994	1.078100	24.385	1.45423
0.2001	0.983035	7.6158	1.43251	0.7993	1.085230	27.144	1.45578
0.2998	1.021567	11.202	1.44095	0.8999	1.091254	29.678	1.45708
0.4004	1.040982	14.756	1.44572	1.0000	1.095664	32.136	1.45839

TABLE S-II. Fitting parameters and root-mean-square deviations (rmsd) σ of Eq. 1 for the PEGDA + alcohol binary mixtures at temperatures (288.15 to 323.15) K and at atmospheric pressure

Property	A_{00}	A_{01} / K^{-1}	A_{10}	A_{11} / K^{-1}	A_{20}	A_{21} / K^{-1}	σ
PEGDA (1) + ethanol (2)							
$\rho / 10^3 \text{ kg m}^{-3}$	0.370515	-0.000778	-0.020648	-0.000024	0.073749	-0.000001	0.0023
n_D	0.48360	-0.00031	-0.01491	0.00002	0.18838	-0.00030	0.0016
PEGDA (1) + 1-propanol (2)							
$\rho / 10^3 \text{ kg m}^{-3}$	0.375663	-0.000765	-0.028148	-0.000038	0.098665	0.000026	0.0006
n_D	0.47056	-0.00026	-0.00713	-0.00001	0.12950	0.00001	0.0007
PEGDA (1) + 1-butanol (2)							
$\rho / 10^3 \text{ kg m}^{-3}$	0.388889	-0.000780	-0.042574	-0.000027	0.135574	0.000002	0.0008
n_D	0.47126	-0.00027	-0.00867	0.00000	0.17556	-0.00005	0.0002

TABLE S-III. Fitting parameters and root-mean-square deviations (rmsd) σ of Eqs. 2 and 3 for the PEGDA + alcohol binary mixtures at temperatures (288.15 to 323.15) K and at atmospheric pressure

Property	T / K	B_0	B_1	B_2	B_3	σ
PEGDA (1) + ethanol (2)						
$\eta / \text{mPa s}$	288.15	-0.64267	118.80	158.92	-105.14	1.4619
	293.15	-0.31062	100.60	96.008	-70.420	1.0931
	298.15	-0.07072	86.966	52.898	-44.968	0.8104
	303.15	0.05082	74.390	29.523	-30.759	0.6683
	308.15	0.16603	64.579	12.939	-19.859	0.5122
	313.15	0.25578	55.716	4.4642	-13.902	0.3930
	318.15	0.30445	49.361	-3.8550	-7.7126	0.3054
	323.15	0.32762	42.666	-5.0895	-6.0363	0.2528
PEGDA (1) + 1-propanol (2)						
$\eta / \text{mPa s}$	288.15	1.6415	92.930	197.51	-119.60	0.7883
	293.15	1.4509	80.832	125.50	-81.588	0.6454
	298.15	1.2877	71.334	76.395	-53.944	0.5262
	303.15	1.2081	61.561	48.481	-37.827	0.4125
	308.15	1.1356	53.139	31.148	-27.473	0.3246
	313.15	1.0551	46.504	18.475	-19.395	0.2627
	318.15	0.98725	40.787	10.293	-13.894	0.2144
	323.15	0.91941	36.353	4.4007	-9.7536	0.1796
PEGDA (1) + 1-butanol (2)						
$\eta / \text{mPa s}$	288.15	2.8354	74.864	197.69	-102.30	0.4282
	293.15	2.4309	65.883	130.57	-72.254	0.3856
	298.15	2.1826	56.316	90.060	-53.174	0.2883
	303.15	1.8880	50.197	58.993	-37.427	0.2595
	308.15	1.6853	43.916	40.558	-28.029	0.2149
	313.15	1.5151	38.557	27.738	-21.034	0.1731
	318.15	1.3601	34.166	18.396	-15.637	0.1455
	323.15	1.2259	30.820	11.304	-11.366	0.1351
PEGDA (1) + ethanol (2)						
Property	x_1	C_0	C_1	σ		
$\ln(\eta / \text{mPa s})$	0.0000	-5.5483	1677.4	0.0042		
	0.0513	-6.0329	2246.8	0.0050		
	0.1000	-6.4100	2521.1	0.0097		
	0.2000	-7.4548	3089.9	0.0159		
	0.3000	-8.1825	3453.8	0.0177		
PEGDA (1) + ethanol (2)						
Property	x_1	C_0	C_1	σ		
	0.3987	-8.7488	3720.9	0.0209		
	0.5001	-9.1953	3925.5	0.0233		
	0.6010	-9.5023	4070.0	0.0257		
	0.7000	-9.7806	4193.9	0.0268		
	0.8047	-10.022	4301.2	0.0280		
	0.9000	-10.269	4402.0	0.0287		

TABLE S-III. Continued

Property	x_1	C_0	C_1	σ
PEGDA (1) + ethanol (2)				
	1.0000	-10.446	4481.6	0.0294
PEGDA (1) + 1-propanol (2)				
$\ln(\eta / \text{mPa s})$	0.0000	-6.1308	2023.7	0.0045
	0.0508	-6.4396	2407.0	0.0068
	0.1001	-6.9256	2704.0	0.0130
	0.1999	-7.6696	3148.1	0.0160
	0.2999	-8.2524	3455.9	0.0191
	0.3999	-8.7353	3701.1	0.0210
	0.4997	-9.1750	3907.9	0.0236
	0.5994	-9.5310	4069.8	0.0254
	0.7004	-9.8371	4207.2	0.0275
	0.7993	-10.085	4316.6	0.0282
	0.8997	-10.271	4401.9	0.0285
	1.0000	-10.446	4481.6	0.0294
PEGDA (1) + 1-butanol (2)				
$\ln(\eta / \text{mPa s})$	0.0000	-6.8094	2311.3	0.0028
	0.0539	-6.6488	2490.7	0.0068
	0.1001	-7.0270	2725.6	0.0130
	0.2001	-7.5850	3098.9	0.0157
	0.2998	-8.1438	3402.5	0.0193
	0.4004	-8.6100	3640.9	0.0217
	0.5001	-9.0514	3850.2	0.0238
	0.5996	-9.4165	4019.9	0.0255
	0.6994	-9.7206	4159.8	0.0261
	0.7993	-9.9938	4282.4	0.0273
	0.8999	-10.243	4391.6	0.0281
	1.0000	-10.446	4481.6	0.0294