

Density, Speed of Sound, Viscosity, Refractive Index and Excess Volume of N- Methyl-2-Pyrrolidone (NMP) + Water + Ethanol from $T = (293.15 \text{ to } 323.15) \text{ K}$

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Supporting Information Available

Table S1. Excess Volume V^E for the System N-Methyl-2-Pyrrolidone (1) + Water (2) + Ethanol (3) from $T = (293.15 \text{ to } 323.15) \text{ K}$ at $p = 10^5 \text{ Pa}$ ^a

x_1	x_2	$T/K=293.15$	$T/K=303.15$	$T/K=313.15$	$T/K=323.15$
$V^E/\text{m}^3 \cdot \text{mol}^{-1}$					
0.0999	0.8008	-0.8965	-0.8476	-0.8047	-0.7660
0.1008	0.6993	-1.1566	-1.1112	-1.0712	-1.0363
0.1005	0.6137	-1.0787	-1.0356	-0.9933	-0.9564
0.1003	0.4993	-1.2180	-1.1828	-1.1507	-1.1200
0.0996	0.4013	-1.1701	-1.1434	-1.1184	-1.0937
0.0995	0.3010	-0.7942	-0.7696	-0.7458	-0.7213
0.0994	0.2038	-0.8305	-0.8186	-0.8066	-0.7934
0.0996	0.1038	-0.5729	-0.5690	-0.5649	-0.5597
0.2004	0.6997	-1.1452	-1.0567	-1.0154	-0.9624
0.2004	0.5987	-1.2374	-1.1843	-1.1348	-1.0875
0.1993	0.5013	-1.2341	-1.1925	-1.1522	-1.1134
0.1995	0.4003	-1.1726	-1.1405	-1.1097	-1.0794
0.1993	0.3010	-1.0431	-1.0211	-1.0000	-0.9787
0.2001	0.1986	-0.8597	-0.8482	-0.8366	-0.8249
0.1997	0.1019	-0.6355	-0.6320	-0.6290	-0.6262
0.2994	0.6010	-1.2406	-1.1778	-1.1181	-1.0600
0.2997	0.5007	-1.2317	-1.1820	-1.1346	-1.0879
0.2999	0.4008	-1.1646	-1.1281	-1.0926	-1.0576
0.2978	0.3042	-1.0493	-1.0249	-1.0010	-0.9772
0.2997	0.2020	-0.8713	-0.8583	-0.8457	-0.8334
0.2981	0.1063	-0.6619	-0.6580	-0.6546	-0.6520
0.3992	0.5016	-1.2004	-1.1449	-1.0912	-1.0375
0.4010	0.3992	-1.1205	-1.0801	-1.0406	-1.0008
0.3997	0.3017	-1.0252	-0.9987	-0.9727	-0.9466
0.3963	0.2058	-0.8661	-0.8517	-0.8377	-0.8238
0.3989	0.1002	-0.5499	-0.5459	-0.5420	-0.5385
0.4997	0.4023	-1.0631	-1.0187	-0.9749	-0.9303
0.5004	0.2986	-0.9408	-0.9117	-0.8830	-0.8539
0.5011	0.1987	-0.7761	-0.7604	-0.7451	-0.7301
0.4998	0.1006	-0.5826	-0.5777	-0.5736	-0.5706
0.5991	0.3013	-0.8546	-0.8226	-0.7903	-0.7573
0.5971	0.2020	-0.7065	-0.6884	-0.6706	-0.6526
0.5995	0.0990	-0.5407	-0.5352	-0.5305	-0.5268
0.6959	0.2032	-0.6362	-0.6162	-0.5959	-0.5751
0.6940	0.1084	-0.4753	-0.4675	-0.4599	-0.4530
0.8043	0.0949	-0.3432	-0.3352	-0.3270	-0.3189

^a x_1 and x_2 are mole fraction of NMP and water respectively.

Table S2. Isentropic Compressibilities κ_s , for the System N-Methyl-2-Pyrrolidone (1) + Water (2) + Ethanol (3) from $T = (293.15 \text{ to } 323.15) \text{ K}$ at $p = 10^5 \text{ Pa}$ ^a

x_1	x_2	$T/\text{K}=293.15$	$T/\text{K}=303.15$	$T/\text{K}=313.15$	$T/\text{K}=323.15$
$10^{10} \cdot \kappa_s / \text{Pa}^{-1}$					
0.0999	0.8008	3.55	3.71	3.88	4.07
0.1008	0.6993	4.06	4.27	4.49	4.74
0.1005	0.6137	4.62	4.88	5.15	5.45
0.1003	0.4993	5.20	5.50	5.83	6.20
0.0996	0.4013	5.74	6.09	6.48	6.90
0.0995	0.3010	6.44	6.86	7.31	7.82
0.0994	0.2038	6.84	7.29	7.79	8.34
0.0996	0.1038	7.41	7.91	8.46	9.07
0.2004	0.6997	3.48	3.66	3.87	4.09
0.2004	0.5987	3.99	4.21	4.46	4.73
0.1993	0.5013	4.50	4.76	5.04	5.36
0.1995	0.4003	5.01	5.31	5.64	6.00
0.1993	0.3010	5.51	5.86	6.24	6.65
0.2001	0.1986	6.02	6.41	6.84	7.30
0.1997	0.1019	6.51	6.94	7.42	7.93
0.2994	0.6010	3.54	3.74	3.96	4.19
0.2997	0.5007	4.00	4.23	4.49	4.77
0.2999	0.4008	4.46	4.73	5.02	5.34
0.2978	0.3042	4.92	5.22	5.55	5.91
0.2997	0.2020	5.38	5.72	6.09	6.49
0.2981	0.1063	5.82	6.20	6.62	7.07
0.3992	0.5016	3.63	3.84	4.07	4.32
0.4010	0.3992	4.06	4.30	4.57	4.85
0.3997	0.3017	4.47	4.74	5.03	5.34
0.3963	0.2058	4.48	4.75	5.05	5.37
0.3989	0.1002	4.89	5.20	5.53	5.89
0.4997	0.4023	3.74	3.96	4.20	4.47
0.5004	0.2986	4.14	4.39	4.66	4.96
0.5011	0.1987	4.53	4.80	5.11	5.44
0.4998	0.1006	4.91	5.21	5.55	5.91
0.5991	0.3013	3.86	4.09	4.34	4.61
0.5971	0.2020	4.22	4.48	4.75	5.05
0.5995	0.0990	4.57	4.85	5.16	5.49
0.6959	0.2032	4.40	4.67	4.97	5.29
0.6940	0.1084	4.04	4.54	4.82	5.13
0.8043	0.0949	4.07	4.31	4.58	4.86

^a x_1 and x_2 are mole fraction of NMP and water respectively.

Table S3. Excess isentropic Compressibility κ_s^E , for the System N-Methyl-2-Pyrrolidone (1) + Water (2) + Ethanol (3) from $T = (293.15 \text{ to } 323.15) \text{ K}$ at $p = 10^5 \text{ Pa}$ ^a

x_1	x_2	$T/K=293.15$	$T/K=303.15$	$T/K=313.15$	$T/K=323.15$
$10^{10} \cdot \kappa_s^E / \text{Pa}^{-1}$					
0.0999	0.8008	-1.72	-1.70	-1.70	-1.69
0.1008	0.6993	-1.96	-1.99	-2.05	-2.07
0.1005	0.6137	-1.92	-1.96	-2.05	-2.07
0.1003	0.4993	-1.88	-1.96	-2.07	-2.08
0.0996	0.4013	-1.73	-1.82	-1.93	-1.93
0.0995	0.3010	-1.39	-1.46	-1.56	-1.51
0.0994	0.2038	-1.29	-1.36	-1.45	-1.40
0.0996	0.1038	-1.00	-1.07	-1.15	-1.06
0.2004	0.6997	-1.44	-1.43	-1.43	-1.42
0.2004	0.5987	-1.60	-1.63	-1.68	-1.68
0.1993	0.5013	-1.64	-1.70	-1.78	-1.79
0.1995	0.4003	-1.60	-1.68	-1.77	-1.78
0.1993	0.3010	-1.52	-1.59	-1.68	-1.68
0.2001	0.1986	-1.38	-1.46	-1.55	-1.53
0.1997	0.1019	-1.23	-1.30	-1.38	-1.34
0.2994	0.6010	-1.15	-1.15	-1.15	-1.16
0.2997	0.5007	-1.30	-1.33	-1.37	-1.38
0.2999	0.4008	-1.37	-1.41	-1.48	-1.49
0.2978	0.3042	-1.37	-1.44	-1.52	-1.53
0.2997	0.2020	-1.33	-1.40	-1.48	-1.49
0.2981	0.1063	-1.27	-1.34	-1.41	-1.40
0.3992	0.5016	-0.92	-0.92	-0.93	-0.93
0.4010	0.3992	-1.05	-1.08	-1.12	-1.13
0.3997	0.3017	-1.15	-1.19	-1.26	-1.28
0.3963	0.2058	-1.56	-1.65	-1.75	-1.80
0.3989	0.1002	-1.57	-1.66	-1.78	-1.82
0.4997	0.4023	-0.71	-0.71	-0.73	-0.72
0.5004	0.2986	-0.86	-0.89	-0.92	-0.92
0.5011	0.1987	-0.95	-1.00	-1.05	-1.05
0.4998	0.1006	-1.02	-1.08	-1.14	-1.14
0.5991	0.3013	-0.55	-0.55	-0.57	-0.57
0.5971	0.2020	-0.70	-0.73	-0.77	-0.78
0.5995	0.0990	-0.83	-0.87	-0.91	-0.92
0.6959	0.2032	0.01	0.03	0.06	0.10
0.6940	0.1084	-0.83	-0.61	-0.65	-0.65
0.8043	0.0949	-0.32	-0.33	-0.35	-0.35

^a x_1 and x_2 are mole fraction of NMP and water respectively.

