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Two new models for viscosity prediction of binary, ternary and higher order liquid mixtures

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SUPPLEMENTARY INFORMATION

Table S1: Comparison of AAPD values of various viscosity relation for n-alkane binary mixtures at 298.15 K.

S.No.	Binary Systems*	Bingham	Frenkel	KM	HU	SW	Model1	Model 2	ECN	UNIFAC
1	Decane + Dodecane	1.52	0.92	1.18	1.52	0.95	0.80	0.98	5.86	0.68
2	Decane + Hexadecane	9.47	1.42	5.80	9.47	4.11	2.29	3.93	1.03	1.31
3	Decane + Undecane	0.37	0.40	0.55	0.37	0.49	0.39	0.49	7.12	0.36
4	Dodecane + Hexadecane	4.78	2.26	1.58	4.78	1.03	1.99	1.01	3.91	1.03
5	Heptane + Decane	3.00	0.87	2.69	3.00	1.49	0.60	1.59	2.99	1.79
6	Heptane + Dodecane	11.05	2.97	3.98	11.05	1.42	3.59	1.48	5.14	1.55
7	Heptane + Hexadecane	25.16	2.68	13.68	25.16	9.37	5.61	8.40	12.93	0.47
8	Heptane + Nonane	2.10	0.76	0.88	2.10	0.62	0.78	0.63	4.35	0.71
9	Heptane + Octane	0.96	0.68	0.46	0.96	0.54	0.68	0.53	6.02	0.63
10	Heptane + Undecane	6.59	1.44	3.21	6.59	1.36	1.72	1.44	0.91	0.45
11	Hexane + Decane	5.10	1.66	4.70	5.10	2.32	0.77	2.49	0.98	0.61
12	Hexane + Dodecane	14.17	3.12	7.23	14.17	3.20	3.29	3.24	9.92	1.37
13	Hexane + Heptane	0.62	0.39	0.31	0.62	0.35	0.39	0.34	6.40	0.29
14	Hexane + Hexadecane	29.90	2.31	18.16	29.90	12.43	3.41	11.11	17.54	0.703
15	Hexane + Nonane	3.53	0.78	2.20	3.53	0.66	0.82	0.79	1.51	0.701
16	Hexane + Octane	2.00	0.79	0.76	2.00	0.51	0.80	0.48	4.03	0.66
17	Hexane + Undecane	9.65	2.11	5.44	9.65	2.21	1.06	2.36	5.74	1.42
18	Nonane + Decane	0.62	0.71	0.83	0.62	0.78	0.71	0.79	7.18	0.62
19	Nonane + Dodecane	4.33	2.25	0.96	4.33	0.63	1.94	0.66	2.90	1.75
20	Nonane + Hexadecane	14.01	2.14	7.81	14.01	5.39	3.54	5.04	3.12	2.1
21	Nonane + Undecane	2.07	0.92	0.69	2.07	0.54	0.97	0.56	5.06	0.54
22	Octane + Decane	1.06	0.58	1.49	1.06	1.01	0.45	1.05	5.94	0.55
23	Octane + Dodecane	7.01	2.19	2.22	7.01	0.88	2.53	0.94	0.70	1.03
24	Octane + Hexadecane	19.57	2.62	10.07	19.57	6.76	3.21	6.18	7.75	0.46
25	Octane + Nonane	1.31	2.99	0.75	1.31	0.83	1.00	0.81	5.80	0.59
26	Octane + Undecane	3.91	1.21	1.35	3.91	0.50	0.34	0.55	2.80	0.52
27	Pentane + Decane	7.39	2.29	8.41	7.39	4.31	0.81	4.49	6.40	5.03
28	Pentane + Dodecane	17.19	2.48	12.30	17.19	6.37	1.51	6.27	16.19	4.28
29	Pentane + Heptane	0.95	2.90	2.27	1.45	1.25	0.80	1.29	4.91	2.74
30	Pentane + Hexadecane	34.59	4.30	24.43	34.59	17.06	2.19	15.16	23.32	3.69
31	Pentane + Hexane	0.99	1.59	0.21	0.99	0.49	0.61	0.49	5.68	0.52
32	Pentane + Nonane	5.51	0.12	5.02	5.51	1.98	0.28	2.15	3.46	3.37
33	Pentane + Octane	3.04	1.78	3.13	3.04	1.14	0.25	1.25	0.64	2.82
34	Pentane + Undecane	11.95	1.02	10.02	11.95	5.00	0.87	5.04	11.86	0.45
35	Undecane + Dodecane	1.75	1.89	1.24	1.75	1.30	1.14	1.30	5.49	1.12
36	Undecane + Hexadecane	7.12	1.79	3.00	7.12	1.88	2.02	1.78	2.29	0.4
	Grand AAPD	**7.62**	**1.70**	**4.70**	**7.63**	**2.81**	**1.50**	**2.70**	**6.05**	**1.31**

*Ref#[29]

Table S2: Comparison of AAPD values of various viscosity models for Binary systems at different temperatures.

S.No	Binary Systems	Temp (K)	Bingham	Frenkel	KM	HU	SW	Model 1	Logarith-mic	ECN	Ref.
1	JP-10 + n-octane	293.15	45.09	26.74	12.39	45.09	7.24	31.55	10.41	27.04	30
2	JP-10 + 2,2,4-trimethylpentane	293.15	43.10	23.82	9.04	43.10	3.63	34.39	7.65	23.50	30
3	JP-10 + 2,4-dimethylhexane	293.15	52.90	30.37	13.47	52.90	6.91	29.82	11.29	28.47	30
4	JP-10 + 3-methylheptane	293.15	49.01	28.67	13.10	49.01	7.30	37.20	10.99	27.93	30
5	Pyridine + m xylene	293.15	10.67	9.08	7.53	10.67	8.47	7.45	6.87	1.47	31
6	Pyridine + o xylene	293.15	4.01	3.73	3.46	4.01	3.96	3.53	3.51	5.50	31
7	Pyridine + p xylene	293.15	8.44	7.11	5.80	8.44	6.70	5.84	5.44	2.22	31
8	Phenetole + 1-pentanol	293.15	43.14	35.38	28.41	43.14	24.01	45.48	20.40	35.00	32
9	phenetole + 1-hexanol	293.15	60.45	46.66	35.01	60.45	25.02	56.12	28.98	49.67	32
10	phenetole + 1-heptanol	293.15	66.46	46.07	30.13	66.46	19.76	56.43	24.68	51.96	32
11	phenetole + 1-octanol	293.15	71.38	43.73	23.57	71.38	12.81	55.60	19.32	51.86	32
12	Propyl Propanoate + Hexane	298.15	11.32	8.13	5.18	11.32	6.09	7.20	5.18	1.50	33
13	Propyl Propanoate + Benzene	298.15	2.65	2.63	2.61	2.65	2.69	4.10	3.41	4.94	33
14	Hexane + Benzene	298.15	18.41	15.78	13.20	18.41	11.01	17.20	11.40	6.42	33
15	1,4-Dioxane + Ethanediol	298.15	124.78	69.55	35.20	124.78	10.67	133.75	30.10	77.30	34
16	1,4-Dioxane + Tributylamine	298.15	10.00	9.88	9.76	10.00	10.22	15.87	12.73	3.34	34
17	1,4-Dioxane + Triethylamine	298.15	28.90	20.83	13.71	28.90	7.88	27.14	11.38	12.32	34
18	Ethylmethylketone + 2-propanol	298.15	42.44	25.63	12.28	42.44	2.33	42.10	10.50	41.13	35
19	Ethylmethylketone + 2-Butanol	298.15	45.07	19.41	3.35	45.07	9.61	36.49	2.79	39.36	35
20	Ethylmethylketone + 2-pentanol	298.15	87.51	50.09	24.52	87.51	13.21	63.23	20.81	77.98	35
21	Ethylmethylketone+ 2-hexanol	298.15	83.21	41.55	14.94	83.21	6.16	64.02	13.48	69.47	35
22	Ethylmethylketone + 2-heptanol	298.15	104.13	49.16	17.61	104.13	12.68	74.33	16.65	80.80	35
23	ethanol + methylacetate	293.15	38.78	31.57	25.17	38.78	15.38	57.42	23.29	38.44	36
24	ethanol +ethylacetate	293.15	32.92	27.85	23.20	32.92	13.29	48.18	23.29	29.54	36
25	methanol + ethylacetate	293.15	9.97	9.65	9.34	9.97	5.24	30.75	15.99	3.39	36
26	methanol + methylacetate	293.15	13.37	12.58	11.80	13.37	7.11	29.00	15.48	9.87	36
27	N,N-dimethylaniline +p-chloroacetophenone	303.15	5.32	3.01	0.85	5.32	1.38	2.82	1.20	3.36	37
28	N,N-dimethylaniline +p-methylacetophenone	303.15	2.84	2.42	2.00	2.84	2.10	2.13	1.82	4.38	37
29	N,N-dimethylaniline +propiophenone	303.15	2.19	1.89	1.59	2.19	1.70	1.64	1.69	5.03	37
30	1,4-Dioxane + Hexane	298.15	40.11	29.16	19.74	40.11	14.82	32.22	16.15	20.98	34
31	Ethyl Chloroacetate + Hexane	298.15	25.96	17.26	9.68	25.96	10.29	14.88	8.95	9.93	38
32	Ethyl Chloroacetate + Heptane	298.15	21.67	16.12	11.07	21.67	10.62	14.88	9.35	5.15	38
33	Ethyl Chloroacetate + octane	298.15	15.44	12.24	9.20	15.44	8.23	11.78	7.57	0.96	38
34	Ethyl Chloroacetate + Nonane	298.15	12.62	11.25	9.92	12.62	8.97	10.75	8.13	0.91	38
35	Ethyl Chloroacetate + Decane	298.15	7.84	7.42	7.00	7.84	6.28	7.48	5.91	5.78	38
36	Ethyl Chloroacetate+ Dodecane	298.15	6.04	5.86	5.68	6.04	5.87	5.66	5.51	4.70	38
37	2-propanol +	298.15	47.84	41.14	34.98	47.84	26.56	58.11	33.09	39.09	39

	tetrahydropyran										
38	1,4-Dioxane + 1-Propanol	298.15	37.96	36.32	34.70	37.96	30.84	43.96	32.05	32.66	40
39	1,4-Dioxane + 2-Propanol	298.15	44.25	42.30	40.38	44.25	36.19	45.95	36.20	39.80	40
40	3-Pentanone + Ethylbenzene	293.15	1.78	1.17	0.58	1.78	0.99	0.97	0.76	3.84	41
41	3-Pentanone + o-Xylene	293.15	3.60	2.25	0.94	3.60	1.37	1.90	1.08	2.00	41
42	2-Butoxyethanol + 1-hexanol	298.15	9.72	8.76	7.82	9.72	7.64	9.86	6.99	3.11	42
43	2-Butoxyethanol + 1-octanol	298.15	15.46	11.15	7.14	15.46	5.85	12.20	6.31	6.60	42
44	2-Butoxyethanol + 1-decanol	298.15	20.90	11.61	3.72	20.90	2.83	13.17	3.86	7.97	42
45	m- xylene+decane	308.15	3.79	3.27	2.75	3.79	3.37	2.91	3.15	5.72	43
46	cyclohexane + m xylene	308.15	11.26	10.58	9.91	11.26	8.58	11.62	8.67	2.06	43
47	cyclohexane + cyclooctane	308.15	9.27	5.74	2.38	9.27	3.02	5.08	2.55	0.95	43
48	cyclohexane + chlorobenzene	308.15	7.97	7.91	7.85	7.97	7.36	8.32	7.06	1.22	43
49	cyclohexane + decane	308.15	2.87	2.87	2.86	2.87	2.46	7.17	4.84	1.38	43
50	m xylene+ cyclooctane	308.15	38.51	28.71	20.10	38.51	16.14	30.18	16.47	16.68	43
51	m xylene+ chlorobenzene	308.15	0.376	0.144	0.187	0.376	0.19	0.21	0.16	6.27	43
52	cyclooctne + chlorobenzene	308.15	20.43	15.05	10.14	20.43	7.47	16.78	8.30	5.45	43
53	cyclooctne + decane	308.15	18.43	14.14	10.15	18.43	5.59	19.80	8.75	2.50	43
54	chlorobenzene +decane	308.15	4.03	4.00	4.00	4.02	4.07	4.58	4.40	1.30	43
55	DEGMME + $CH_3(CH_2)_5OH$	298.15	18.65	18.26	17.86	18.65	16.76	23.02	18.52	2.71	64
56	DEGMME + $CH_3(CH_2)_7OH$	298.15	20.35	17.80	15.24	20.35	13.63	22.36	17.87	2.57	64
57	DEGMME + $CH_3(CH_2)_9OH$	298.15	26.11	19.55	13.29	26.11	11.55	24.87	18.19	2.36	64
58	1-Chlorohexadecane + 1,2,4 Trimethylcyclohexane	298.15	15.32	2.60	15.34	15.32	12.28	0.54	11.50	17.0	44
59	1-Chlorohexadecane + Cyclohexane	298.15	5.00	10.25	21.67	5.00	12.28	8.05	11.92	24.8	44
60	1-Chlorohexadecane + Benzene	298.15	19.96	4.58	20.58	19.96	10.25	1.76	9.83	5.6	44
61	1-Chlorohexadecane + Methylcyclohexane	298.15	15.39	5.32	19.74	15.39	13.26	3.01	12.84	21.8	44
62	1-Chlorohexadecane + Toluene	298.15	25.89	2.83	20.04	25.89	12.65	11.90	1.46	3.5	44
63	1-Chlorohexadecane + p-Xylene	298.15	25.80	1.47	15.05	25.80	12.88	4.51	9.24	2.5	44
64	1-Chlorohexane + Cyclohexane	298.15	10.09	9.74	9.40	10.09	7.95	14.82	10.75	4.1	44
65	1-Chlorohexane + (cis + trans) Dimethylcyclohexane	298.15	5.52	5.16	4.81	5.52	4.42	5.98	4.85	2.5	44
66	1-Chlorohexane + Benzene	298.15	6.05	5.96	5.87	6.05	6.21	8.56	7.69	2.5	44
67	1-Chlorohexane + Methylcyclohexane	298.15	3.03	3.03	3.03	3.03	3.01	3.72	3.41	1.5	44
68	1-Chlorohexane + Toluene	298.15	2.76	2.52	2.28	2.76	2.70	2.97	2.95	4.5	44
69	1-Chlorohexane + o-Xylene	298.15	1.81	1.78	1.75	1.81	1.60	2.30	1.89	5.1	44
70	2-Ethoxyethanol + 2,2,4-Trimethylpentane	298.15	36.04	24.88	15.32	36.04	6.12	45.34	15.93	16.3	45
71	2-Ethoxyethanol + Acetonitrile	298.15	23.66	8.62	3.24	23.66	3.21	9.87	2.59	10.8	48
72	2-Ethoxyethanol + Butanol	298.15	6.42	5.92	5.41	6.42	4.42	8.41	5.78	0.8	46
73	2-Ethoxyethanol + Chlorobenzene	298.15	25.64	18.51	13.54	25.64	9.06	32.18	11.09	21.7	47
74	2-Ethoxyethanol + Cyclohexane	298.15	13.94	11.46	9.19	13.94	8.53	13.09	9.23	5.2	45
75	2-Ethoxyethanol + Decane	298.15	20.33	17.11	14.07	20.33	8.16	33.09	16.29	4.7	45
76	2-Ethoxyethanol + Dioxane	298.15	13.67	12.65	11.64	13.67	13.05	13.48	11.65	7.7	48
77	2-Ethoxyethanol + Ethanol	298.15	3.75	4.97	6.11	3.75	3.87	2.10	2.27	11.0	46
78	2-Ethoxyethanol + Heptane	298.15	48.15	33.01	20.59	48.15	11.46	52.66	19.01	26.4	45

79	2-Ethoxyethanol + Heptanol	298.15	18.35	10.85	4.60	18.35	4.22	13.46	5.17	7.5	46
80	2-Ethoxyethanol + Hexane	298.15	54.13	33.18	17.21	54.13	11.01	52.11	15.23	31.0	45
81	2-Ethoxyethanol + Hexanol	298.15	15.56	11.15	7.11	15.56	6.25	13.50	7.27	6.9	46
82	2-Ethoxyethanol + Methanol	298.15	7.04	12.68	16.87	7.04	12.07	9.69	9.89	15.1	46
83	2-Ethoxyethanol + Nonane	298.15	27.08	21.18	15.80	27.08	9.55	38.50	17.15	9.9	45
84	2-Ethoxyethanol + Octane	298.15	36.45	26.73	18.29	36.45	10.97	45.29	18.91	17.2	45
85	2-Ethoxyethanol + Octanol	298.15	20.40	9.60	1.48	20.40	3.92	12.49	2.63	7.1	46
86	2-Ethoxyethanol + Pentanol	298.15	11.88	9.78	7.74	11.88	6.54	12.18	7.75	4.6	46
87	2-Ethoxyethanol + Propanol	298.15	5.25	5.22	5.19	5.25	7.59	9.05	6.77	1.6	46
88	2-Ethoxyethanol + Tetrahydrofuran	298.15	15.75	6.97	3.85	15.75	4.84	10.99	3.41	5.2	48
89	2-Methoxyethanol + Tetrahydrofuran	298.15	6.08	3.85	8.52	6.08	11.04	4.93	8.50	11.7	49
90	2-Propoxyethanol + N,N-Dimethylformamide	298.15	1.93	3.07	6.73	1.93	8.97	2.42	5.89	4.9	50
91	Acetone + Benzene	298.15	7.10	4.83	2.67	7.10	3.56	4.91	3.48	2.0	44
92	Acetone + Chlorohexane	298.15	1.91	1.40	4.48	1.91	1.54	0.54	0.44	3.1	44
93	Acetone + Cyclohexane	298.15	25.61	18.79	12.67	25.61	13.97	19.69	14.13	4.5	44
94	Acetone + Ethyl Acetate	298.15	0.48	1.00	1.51	0.48	0.56	0.30	0.27	7.3	44
95	Acetone + Propyl Propionate	298.15	0.25	2.65	4.93	0.25	1.70	0.68	0.69	5.3	44
96	Acetone + Toluene	298.15	2.49	1.10	2.39	2.49	1.18	1.46	1.31	4.0	44
97	Acetone + cis 1,2 Dimethylcyclohexane	298.15	21.60	13.57	6.44	21.60	10.93	13.98	10.76	3.6	44
98	Acetone + o-Xylene	298.15	3.72	0.58	4.07	3.72	2.04	0.97	0.94	0.7	44
99	Cyclohexane + Benzene	298.15	21.26	20.11	18.98	21.26	18.87	20.57	14.04	6.5	51
100	Ethyl Acetate + (cis + trans) Dimethylcyclohexane	298.15	13.54	10.45	7.54	13.54	8.03	10.92	8.13	0.4	44
101	Ethyl Acetate + Benzene	298.15	6.26	5.67	5.08	6.26	6.32	7.37	5.22	0.5	44
102	Ethyl Acetate + Chlorohexadecane	298.15	33.03	4.22	23.83	33.03	17.00	3.04	5.24	15.9	44
103	Ethyl Acetate + Chlorohexane	298.15	3.27	2.13	1.02	3.27	3.43	2.23	1.90	2.9	44
104	Ethyl Acetate + Cyclohexane	298.15	25.85	22.52	19.36	25.85	17.27	26.71	15.10	11.4	44
105	Ethyl Acetate + Toluene	298.15	1.62	1.31	1.00	1.62	2.96	1.45	1.02	4.8	44
106	Ethyl Acetate + o-Xylene	298.15	3.22	1.67	0.17	3.22	1.46	1.87	0.49	1.7	44
107	Ethylenediamine + 1-Butanol	298.15	5.86	7.19	8.49	5.86	8.18	7.06	5.17	10.8	52
108	Ethylenediamine + 2-Propanol	298.15	2.06	2.51	3.06	2.06	3.34	2.06	3.06	6.5	52
109	Ethylenediamine + Decanol	298.15	11.79	9.85	21.45	11.79	20.42	8.97	10.34	10.4	63
110	Ethylenediamine + Hexanol	298.15	3.77	4.63	9.18	3.77	7.09	4.53	7.20	7.0	63
111	Ethylenediamine + Octanol	298.15	8.48	7.50	15.43	8.48	11.53	7.42	9.01	8.5	63
112	Ethylenediamine + 2-methyl-propanol	298.15	4.81	5.63	7.41	4.81	7.46	5.42	3.18	7.1	52
113	Methyl Ethyl Ketone + Benzene	298.15	6.41	5.34	4.29	6.41	4.16	5.81	4.35	0.6	44
114	Methyl Ethyl Ketone + Chlorohexadecane	298.15	31.34	7.74	29.76	31.34	19.59	1.61	8.90	12.6	44
115	Methyl Ethyl Ketone + Chlorohexane	298.15	1.41	0.53	2.23	1.41	2.01	0.73	0.66	5.3	44
116	Methyl Ethyl Ketone + Ethyl Acetate	298.15	0.44	0.36	0.30	0.44	2.47	0.74	0.68	7.1	44
117	Methyl Ethyl Ketone + Methyl Cyclohexane	298.15	9.11	7.34	5.62	9.11	6.65	7.36	5.02	1.4	44

118	Methyl Ethyl Ketone + Propyl Propionate	298.15	0.38	0.98	2.20	0.38	1.53	0.14	0.13	6.6	44
119	Methyl Ethyl Ketone + Toluene	298.15	1.75	1.10	0.45	1.75	2.49	1.16	0.99	4.7	44
120	Methyl Ethyl Ketone + p-Xylene	298.15	1.59	1.13	1.00	1.59	2.29	1.33	1.30	5.0	44
121	Propyl Propionate + 1,2,3 Trimethylcyclohexane	298.15	5.44	5.19	4.94	5.44	6.05	5.21	4.97	0.8	44
122	Propyl Propionate + Benzene	298.15	2.77	2.77	2.76	2.77	2.72	5.47	4.25	5.0	44
123	Propyl Propionate + Chlorohexadecane	298.15	25.90	2.27	16.32	25.90	12.51	4.98	9.20	9.8	44
124	Propyl Propionate + Chlorohexane	298.15	1.06	1.02	0.97	1.06	1.98	1.02	0.90	6.3	44
125	Propyl Propionate + Methylcyclohexane	298.15	6.03	6.00	5.97	6.03	5.77	6.85	6.25	0.7	44
126	Propyl Propionate + Toluene	298.15	0.24	0.16	0.14	0.24	2.29	0.67	0.58	6.9	44
127	Propyl Propionate + p-Xylene	298.15	0.82	0.81	0.81	0.82	1.83	0.90	0.88	6.3	44
128	Undecane + Dodecane	298.15	1.75	1.48	1.24	1.75	2.66	1.50	1.30	5.5	29
129	Undecane + Hexadecane	298.15	7.12	1.79	3.00	7.12	2.76	2.42	1.78	2.3	29
130	Acetone + 2-Propanol	298.15	104.72	70.43	45.11	104.72	39.11	102.39	30.01	1.4	53
131	Acetone + Carbon Tetrachloride	298.15	16.66	9.83	3.82	16.66	14.34	14.16	12.02	1.7	53
132	Acetone + Cyclohexane	298.15	35.16	27.48	20.75	35.16	24.04	28.50	18.11	11.7	53
133	Acetone + Ethanol	298.15	41.61	31.02	21.37	41.61	11.90	50.90	16.79	44.3	53
134	Acetone + Hexane	298.15	5.44	5.44	5.43	5.44	8.09	9.03	7.09	3.2	53
135	Acetone + Methanol	298.15	11.65	9.63	7.72	11.65	9.14	28.23	9.68	6.4	53
136	Carbon Tetrachloride + 2-Propanol	298.15	24.01	19.77	15.88	24.01	10.02	71.23	7.21	42.6	53
137	Carbon Tetrachloride + Cyclohexane	298.15	3.93	3.93	3.93	3.93	7.09	12.03	7.94	1.8	53
138	Chloroform + Methanol	298.15	10.54	10.55	10.55	10.54	12.96	25.87	4.95	10.7	53
139	Cyclohexane + 2-Propanol	298.15	27.73	23.40	19.36	27.73	13.47	37.87	9.07	33.4	53
140	Dimethyl Sulfoxide + Chloroform	298.15	7.07	14.07	20.46	7.07	28.92	5.58	15.05	4.7	53
141	Dimethyl Sulfoxide + Methanol	298.15	34.77	24.63	15.53	34.77	24.14	26.59	10.09	16.9	53
142	Ethanol + 2-Propanol	298.15	5.45	3.34	1.35	10.28	7.66	3.43	2.06	2.8	53
143	Ethanol + Cyclohexane	298.15	8.33	8.13	7.93	8.33	8.50	19.13	5.01	1.7	53
144	Hexane + Chloroform	298.15	2.09	0.71	1.44	4.09	2.78	0.66	0.77	2.3	53
145	Hexane + Cyclohexane	298.15	22.51	14.97	8.44	22.51	9.98	23.15	6.01	2.2	53
146	Hexane + Ethanol	298.15	16.69	7.01	2.97	16.69	25.67	46.17	2.79	8.9	53
147	Methanol + 2-Propanol	298.15	30.13	19.34	10.34	30.13	14.99	19.99	10.92	21.5	53
148	Methanol + Ethanol	298.15	7.73	5.24	2.93	7.73	4.42	5.32	4.31	0.7	53
149	Methyl Acetate + Hexane	298.15	7.05	6.83	6.61	7.05	7.24	8.19	6.85	1.0	53
150	Triethylamine + Chlorobenzene	298.15	2.28	1.15	3.07	2.28	3.56	1.19	2.97	6.6	53
151	Triethylamine + Chloroform	298.15	25.97	26.57	27.16	25.97	26.94	26.55	26.96	27.0	53
152	Triethylamine + Methanol	298.15	21.38	22.12	22.84	21.38	28.46	11.05	12.74	28.2	53
	Grand AAPD		**19.40**	**13.31**	**10.68**	**19.44**	**9.20**	**18.17**	**8.98**	**12.26**	

Table S3: Comparison of AAPD values of various viscosity relations for ternary systems.

S. No.	Ternary systems	Temp (K)	BING	Frenkel	KM	H U	SW	Model 1	Logarithmic	ECN	Ref
1	Cyclohexane +m-xylene + cyclooctane	308.15	21.47	23.22	11.82	61.14	10.35	20.17	12.31	7.32	43
2	cyclohexane +m-xylene + chlorobenzene	308.15	8.06	7.66	8.00	42.65	6.40	10.11	7.74	1.54	43
3	1-Butanol + 1-Chlorobutane+ 1-Butylamine	298.15	40.99	53.67	9.50	101.05	2.36	46.93	9.77	†	54
4	2-Methyl-1-propanol +1-Chlorobutane + 1 Butylamine	298.15	70.94	99.32	18.60	141.11	5.49	80.16	19.08	†	54
5	2-propanol+ tetrahydropyran + 2,2,4 trimethylpentane	303.15	60.20	71.94	41.16	123.42	26.14	89.45	42.16	40.29	32
6	cyclohexane +m-xylene + decane	308.15	7.16	6.74	6.27	40.21	5.75	10.51	7.78	1.05	43
7	water + ethylacetate +ethanol	298.15	23.82	30.44	22.98	41.14	37.85	53.80	22.02	†	55
8	cyclohexane + cyclooctane + chlorobenzene	308.15	14.84	16.3	7.91	52.92	7.36	13.82	8.56	2.82	43
9	Carbon Tetrachloride+ Cyclohexane + Benzene	298.15	2.19	24.29	4.68	37.07	2.48	5.56	4.08	†	56
10	cyclohexane +cyclooctane + decane	308.15	11.68	12.73	5.75	49.44	4.45	14.07	7.29	1.25	43
11	water +ethanol + EG	298.15	40.22	74.16	38.65	76.90	36.54	68.82	42.26	34.03	57
12	cyclohexane + chlorobenzene + decane	308.15	6.21	6.43	6.32	39.67	50.92	9.66	7.68	0.38	43
13	Methyl benzoate + Cyclohexane + 1-Propanol	303.15	21.73	50.75	19.86	60.22	17.02	29.04	20.70	18.73	58
14	m-xylene +cyclooctane + chlorobenzene	308.15	23.60	23.76	13.12	65.69	9.24	22.77	11.44	6.37	43
15	Methyl benzoate + Cyclohexane + 1-Butanol	303.15	32.75	51.70	26.79	73.96	26.78	37.87	27.11	18.61	58
16	m-xylene + cyclooctane + decane	308.15	21.44	22.04	12.87	64.46	8.33	22.99	11.18	5.92	43
17	Methyl benzoate +Cyclohexane + 1-Pentanol	303.15	30.21	38.24	18.93	68.66	19.06	32.10	20.60	12.89	58
18	m-xylene + chlorobenzene+ decane	308.15	4.58	24.47	4.02	36.63	3.26	3.58	3.02	2.79	43
19	cyclooctane + chlorobenzene+decane	308.15	18.70	21.31	10.81	57.40	8.58	21.36	11.20	4.82	43
20	Methyl benzoate +Cyclohexane + 1-hexanol	303.15	35.25	37.13	20.44	75.17	19.88	34.29	19.28	15.54	58
21	Methanol + Ethanol + Water	283.15	45.86	33.58	49.66	29.17	48.66	39.29	38.54	50.74	59
22	Ethanol + 1-Propanol + Water	303.15	32.56	16.05	35.67	11.89	37.37	14.37	27.88	41.88	59
23	Methanol + Ethanol + 1-Propanol	303.15	7.77	29.08	2.25	48.49	2.33	2.61	0.75	2.38	59
24	n-hexane+ cyclohexane+ benzene	298.15	42.62	29.92	31.00	56.92	27.73	31.15	20.67	15.33	51
25	Ethanol +benzene+ n heptane	298.15	27.57	39.94	18.87	58.49	8.18	52.67	21.83	16.86	60
	Grand AAPD		**25.32**	**33.70**	**17.22**	**60.80**	**17.24**	**29.77**	**17.00**	**14.18***	

*Grand AAPD values for 21 systems.

† Insufficient Data

Table S4: Comparison of AAPD values of various viscosity models for Quaternary and Quinary systems at 308.15 K.

S.No	Quaternary Systems	Bingham*	KM*	HU	SW*	Model 1	Logarithmic	GN*	C-R-K*	Arrhe-nius*
1	Toluene + Octane + Ethylbenzene + Tetradecane	7.27	1.70	15.79	103.05	2.83	1.16	4.21	4.10	5.43
2	Toluene + Octane + Ethylbenzene + Hexadecane	9.69	5.44	18.59	87.13	1.62	1.86	3.29	9.74	14.46
3	Toluene + Ethylbenzene + Tetradecane + Hexadecane	6.38	5.17	15.26	74.11	0.61	1.44	1.05	9.52	14.62
4	Octane + Ethylbenzene + Tetradecane + Hexadecane	6.91	4.75	15.02	99.94	1.17	2.12	3.86	7.98	12.78
5	Toluene + Octane + Tetradecane + Hexadecane	7.28	5.60	15.64	91.94	1.03	2.20	1.45	9.33	13.79
	Grand AAPD	**7.51**	**4.53**	**16.06**	**91.23**	**1.45**	**1.75**	**2.77**	**8.13**	**12.21**
	Quinary System									
6	Toluene + Octane + Ethylbenzene +Tetradecane+ Hexadecane	12.24	7.84	16.92	53.52	16.82	2.08	2.34	7.01	11.26

*Ref#[28,61]

Table S5: Comparison of AAPD values of various viscosity relations for Hexanary systems at 298.15 K.

S.No	Quinary systems	Bingham *	KM *	Model 1	Logarithmic	SW*	Additive*
1	Acetone + 5 component Hydrocarbon Mixture	7.53	4.76	3.42	2.68	5.73	0.67
2	Di isopropyl ether + 5 component Hydrocarbon Mixture	7.03	4.67	0.57	0.05	7.68	1.21
3	Methyl ethyl ketone + 5 component Hydrocarbon Mixture	27.97	19.06	2.94	2.25	10.34	15.54
	Grand AAPD	**14.18**	**9.50**	**2.31**	**1.66**	**7.92**	**5.81**

* Ref# [11,62]