

Table:4.4.1: Values of Density (ρ), Viscosity (η), Excess viscosity (η^E), Molar volume (V), Excess molar volume (V^E), Excess Gibbs free energy of activation of viscous flow (G^{*E}) and Grunberg-Nissan interaction parameter (d^1) for the binary liquid mixtures of Butyl carbitol (BC) + N-Butyl amine (NBA) at 308.15

K.

Mole fraction of Butyl carbitol X_{BC}	$\rho \times 10^{-3}$ Kg m ⁻³	$\eta \times 10^3$ Kg m ⁻¹ s ⁻¹	$\eta^E \times 10^3$ Kg m ⁻¹ s ⁻¹	$V \times 10^5$ m ³ mol ⁻¹	$V^E \times 10^6$ m ³ mol ⁻¹	$G^{*E} \times 10^3$ N mol ⁻¹	d^1
0.0000	0.7241	0.4248	0.0000	101.0081	0.0000	0.0000	---
0.0611	0.7457	0.7304	0.1189	105.3796	-0.1189	259.1301	7.2084
0.1276	0.7673	1.0360	0.2212	110.1317	-0.2212	392.7322	5.5985
0.2005	0.7889	1.3416	0.3040	115.3461	-0.3040	461.5525	4.5439
0.2807	0.8105	1.6472	0.3645	121.0847	-0.3645	487.3444	3.7884
0.3692	0.8321	1.9528	0.3996	127.4137	-0.3999	479.7355	3.2158
0.4675	0.8537	2.2584	0.4048	134.4448	-0.4048	442.7938	2.7618
0.5773	0.8753	2.5640	0.3748	142.2990	-0.3748	377.8210	2.3910
0.7007	0.8969	2.8696	0.3033	151.1254	-0.3033	284.1864	2.0812
0.8405	0.9185	3.1752	0.1816	161.1268	-0.1816	159.4479	1.8169
1.0000	0.9399	3.4811	0.0000	172.5716	0.0000	0.0000	---

Table:4.4.2: Values of Density (ρ), Viscosity (η), Excess viscosity (η^E), Molar volume (V), Excess molar volume (V^E), Excess Gibbs free energy of activation of viscous flow (G^{*E}) and Grunberg-Nissan interaction parameter (d^1) for the binary liquid mixtures of Butyl carbitol (BC) + Sec-Butyl amine (SBA) at 308.15 K.

Mole fraction of Butyl carbitol X_{BC}	$\rho \times 10^{-3}$ Kg m ⁻³	$\eta \times 10^3$ Kg m ⁻¹ s ⁻¹	$\eta^E \times 10^3$ Kg m ⁻¹ s ⁻¹	$V \times 10^5$ m ³ mol ⁻¹	$V^E \times 10^6$ m ³ mol ⁻¹	$G^{*E} \times 10^3$ N mol ⁻¹	d^1
0.0000	0.7084	0.3994	0.0000	103.2468	0.0000	0.0000	---
0.0623	0.7316	0.7076	0.1162	107.5566	-0.1162	273.1110	7.4823
0.1301	0.7548	1.0156	0.2153	112.2505	-0.2153	409.3522	5.7584
0.2041	0.7780	1.3240	0.2956	117.3742	-0.2956	477.6902	4.6581
0.2851	0.8012	1.6322	0.3542	122.9793	-0.3542	501.5363	3.8789
0.3743	0.8244	1.9404	0.3875	129.1547	-0.3875	491.1298	3.2896
0.4730	0.8476	2.2486	0.3916	135.9903	-0.3916	451.0657	2.8247
0.5826	0.8708	2.5572	0.3624	143.5764	-0.3624	383.2591	2.4484
0.7053	0.8940	2.8654	0.2925	152.0738	-0.2925	286.8578	2.1338
0.8434	0.9172	3.1736	0.1751	161.6367	-0.1751	160.1982	1.8673
1.0000	0.9399	3.4811	0.0000	172.5716	0.0000	0.0000	---

Table:4.4.3: Values of Density (ρ), Viscosity (η), Excess viscosity (η^E), Molar volume (V), Excess molar volume (V^E), Excess Gibbs free energy of activation of viscous flow (G^{*E}) and Grunberg-Nissan interaction parameter (d^1) for the binary liquid mixtures of Butyl carbitol (BC) + Tert-Butyl amine (TBA) at 308.15 K.

Mole fraction of Butyl carbitol X_{BC}	$\rho \times 10^{-3}$ Kg m ⁻³	$\eta \times 10^3$ Kg m ⁻¹ s ⁻¹	$\eta^E \times 10^3$ Kg m ⁻¹ s ⁻¹	$V \times 10^5$ m ³ mol ⁻¹	$V^E \times 10^6$ m ³ mol ⁻¹	$G^{*E} \times 10^3$ N mol ⁻¹	d^1
0.0000	0.6809	0.4122	0.0000	107.4167	0	0.0000	---
0.0647	0.7068	0.7191	0.1083	111.6330	-0.1083	261.0791	6.9162
0.1347	0.7327	1.0260	0.2004	116.1954	-0.2004	391.4984	5.3591
0.2106	0.7586	1.3329	0.2744	121.1390	-0.2743	456.0710	4.3573
0.2932	0.7845	1.6398	0.3278	126.5168	-0.3278	477.6654	3.6451
0.3836	0.8104	1.9467	0.3573	132.4080	-0.3572	466.2363	3.1045
0.4828	0.8363	2.2536	0.3597	138.8714	-0.3597	426.6532	2.6784
0.5922	0.8622	2.5605	0.3309	146.0002	-0.3308	360.7833	2.3314
0.7135	0.8881	2.8674	0.2655	153.9064	-0.2655	268.6851	2.0419
0.8485	0.9140	3.1743	0.1581	162.6996	-0.1581	149.3790	1.7972
1.0000	0.9399	3.4811	0.0000	172.5716	0.0000	0.0000	---

Table:4.4.4: Values of Density (ρ), Viscosity (η), Excess viscosity (η^E), Molar volume (V), Excess molar volume (V^E), Excess Gibbs free energy of activation of viscous flow (G^{*E}) and Grunberg-Nissan interaction parameter (d^1) for the binary liquid mixtures of Butyl carbitol (BC) + N-Hexyl amine (NHA) at 308.15 K.

Mole fraction of Butyl carbitol X_{BC}	$\rho \times 10^{-3}$ Kg m ⁻³	$\eta \times 10^3$ Kg m ⁻¹ s ⁻¹	$\eta^E \times 10^3$ Kg m ⁻¹ s ⁻¹	$V \times 10^5$ m ³ mol ⁻¹	$V^E \times 10^6$ m ³ mol ⁻¹	$G^{*E} \times 10^3$ N mol ⁻¹	d^1
0.0000	0.7522	0.6001	0.0000	134.5254	0.0000	0.0000	---
0.0797	0.7710	0.8881	0.0584	137.5519	-0.0583	155.7336	3.4346
0.1631	0.7898	1.1761	0.1061	140.7201	-0.1061	239.1864	2.8293
0.2504	0.8086	1.4642	0.1427	144.0353	-0.1426	280.3280	2.4073
0.3420	0.8274	1.7523	0.1669	147.5168	-0.1668	292.3672	2.0905
0.4381	0.8462	2.0404	0.1781	151.1681	-0.1781	282.4380	1.8431
0.5390	0.8650	2.3285	0.1755	154.9993	-0.1755	254.6279	1.6436
0.6453	0.8838	2.6166	0.1574	159.0402	-0.1574	211.1655	1.4774
0.7572	0.9026	2.9047	0.1231	163.2913	-0.1230	153.7422	1.3374
0.8752	0.9214	3.1928	0.0712	167.7729	-0.0712	83.1920	1.2174
1.0000	0.9399	3.4811	0.0000	172.5716	0.0000	0.0000	---

Table:4.4.5: Values of Density (ρ), Viscosity (η), Excess viscosity (η^E), Molar volume (V), Excess molar volume (V^E), Excess Gibbs free energy of activation of viscous flow (G^{*E}) and Grunberg-Nissan interaction parameter (d^1) for the binary liquid mixtures of butyl carbitol (BC) + N-Octyl amine (NOA) at 308.15

K.

Mole fraction of Butyl carbitol X_{BC}	$\rho \times 10^{-3}$ Kg m ⁻³	$\eta \times 10^3$ Kg m ⁻¹ s ⁻¹	$\eta^E \times 10^3$ Kg m ⁻¹ s ⁻¹	$V \times 10^5$ m ³ mol ⁻¹	$V^E \times 10^6$ m ³ mol ⁻¹	$G^{*E} \times 10^3$ N mol ⁻¹	d^1
0.0000	0.7704	0.9263	0.0000	167.7181	0.0000	0.0000	---
0.0975	0.7873	1.1818	0.0064	168.2034	-0.0064	70.2027	1.3016
0.1955	0.8042	1.4373	0.0115	168.6888	-0.0115	110.6690	1.1478
0.2940	0.8211	1.6928	0.0154	169.1744	-0.0153	131.0501	1.0298
0.3932	0.8380	1.9483	0.0175	169.6679	-0.0175	136.7612	0.9346
0.4929	0.8549	2.2038	0.0182	170.1612	-0.0182	131.4276	0.8571
0.5931	0.8718	2.4593	0.0177	170.6542	-0.0178	117.3859	0.7925
0.6940	0.8887	2.7148	0.0155	171.1546	-0.0155	96.1385	0.7370
0.7954	0.9056	2.9703	0.0119	171.6544	-0.0119	69.0211	0.6895
0.8974	0.9225	3.2258	0.0068	172.1574	-0.0068	36.8641	0.6481
1.0000	0.9399	3.4811	0.0000	172.5716	0.0000	0.0000	---

Table:4.4.6: Values of Density (ρ), Viscosity (η), Excess viscosity (η^E), Molar volume (V), Excess molar volume (V^E), Excess Gibbs free energy of activation of viscous flow (G^{*E}) and Grunberg-Nissan interaction parameter (d^1) for the binary liquid mixtures of Butyl carbitol (BC) + Cyclo hexylamine (CHA) at 308.15 K.

Mole fraction of Butyl carbitol X_{BC}	$\rho \times 10^{-3}$ Kg m ⁻³	$\eta \times 10^3$ Kg m ⁻¹ s ⁻¹	$\eta^E \times 10^3$ Kg m ⁻¹ s ⁻¹	$V \times 10^5$ m ³ mol ⁻¹	$V^E \times 10^6$ m ³ mol ⁻¹	$G^{*E} \times 10^3$ N mol ⁻¹	d^1
0.0000	0.8525	1.3245	0.0000	116.3284	0.0000	0.0000	---
0.0697	0.8612	1.5402	0.0654	120.2545	-0.0653	54.6496	1.2884
0.1442	0.8699	1.7559	0.1204	124.4499	-0.1204	93.8406	1.1558
0.2241	0.8786	1.9716	0.1638	128.9495	-0.1638	119.9692	1.0426
0.3101	0.8873	2.1873	0.1940	133.7942	-0.1940	134.4747	0.9443
0.4027	0.8960	2.4030	0.2100	139.0091	-0.2100	138.3242	0.8589
0.5028	0.9047	2.6187	0.2099	144.6463	-0.2098	131.8963	0.7833
0.6113	0.9134	2.8344	0.1916	150.7557	-0.1915	115.2891	0.7160
0.7295	0.9221	3.0501	0.1524	157.4128	-0.1523	88.1691	0.6549
0.8585	0.9308	3.2658	0.0899	164.6769	-0.0899	50.1426	0.6001
1.0000	0.9399	3.4811	0.0000	172.5716	0.0000	0.0000	---

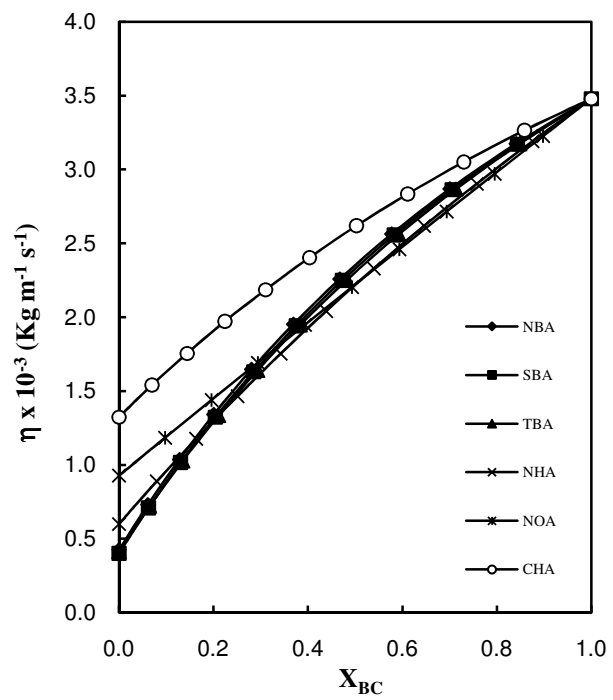


Fig:4.4.1: Plots of viscosities (η) for various amines vs mole fractions of Butyl carbitol (X_{BC}) at 308.15 K.

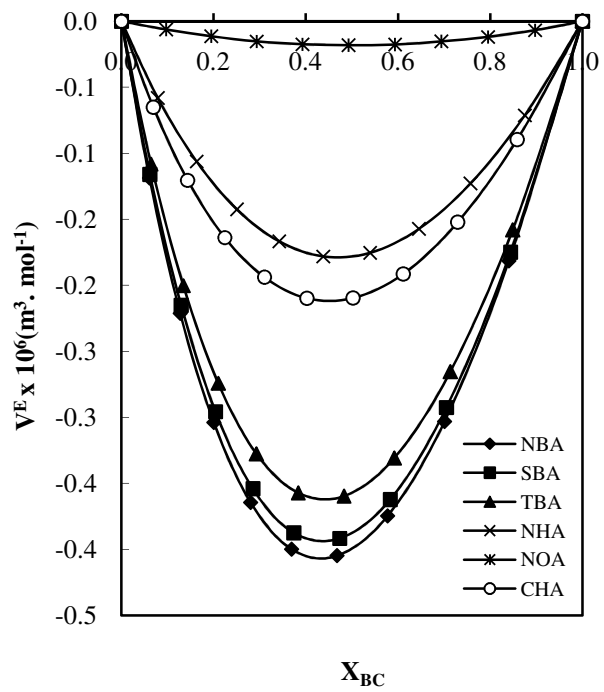


Fig: 4.4.2: Plots of excess volumes (V^E) for various amines vs mole fractions of Butyl carbitol (X_{BC}) at 308.15 K.

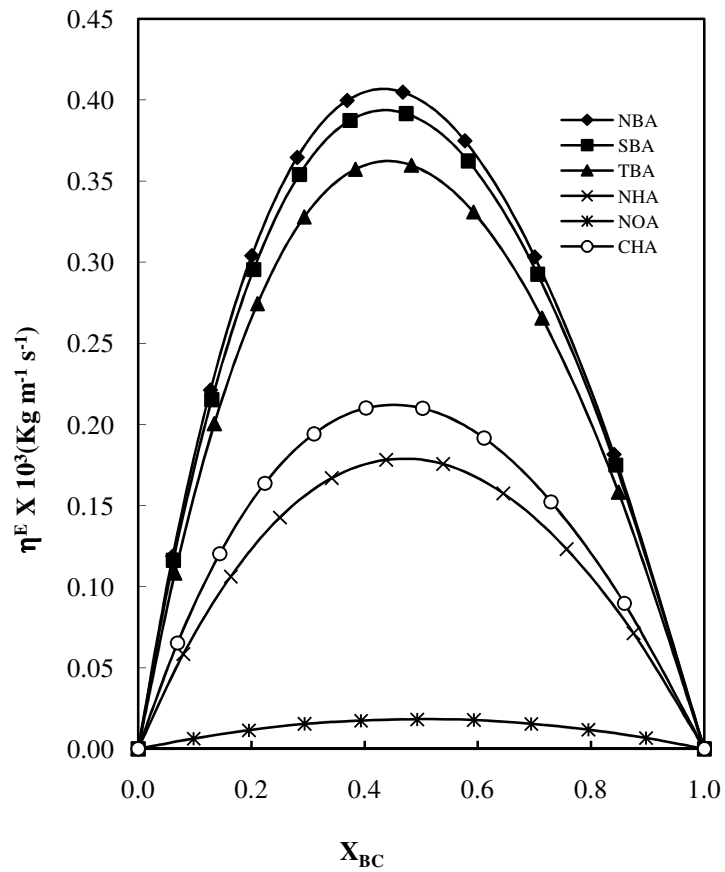


Fig:4.4.3: Plots of excess viscosities (η^E) for various amines vs mole fraction of Butyl Carbitol (X_{BC}) at 308.15 K.

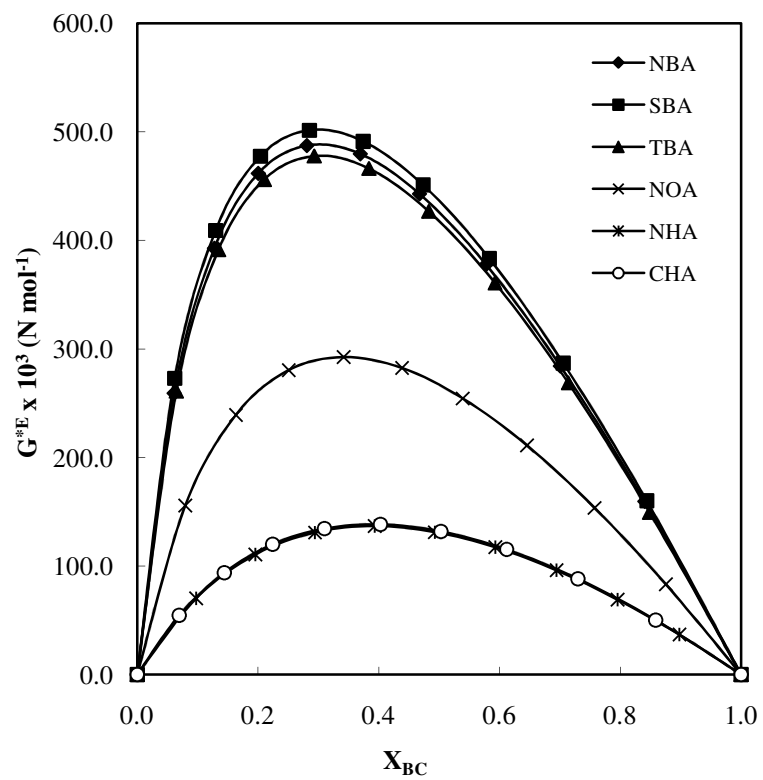


Fig: 4.4.4: Plots of excess Gibbs free energy of activation of viscous flow (G^{*E}) for various amines vs mole fraction of Butyl carbitol X_{BC} at 308.15 K.

Table:4.2.1: Values of Density (ρ), Viscosity (η), Excess viscosity (η^E), Molar volume (V), Excess molar volume (V^E), Excess Gibbs free energy of activation of viscous flow (G^{*E}) and Grunberg-Nissan interaction parameter (d^1) for the binary liquid mixtures of methyl carbitol + N-Butyl amine at 308.15

K.

Mole fraction of Methyl carbitol X_{MC}	$\rho \times 10^{-3}$ Kg m ⁻³	$\eta \times 10^3$ Kg m ⁻¹ s ⁻¹	$\eta^E \times 10^3$ Kg m ⁻¹ s ⁻¹	$V \times 10^5$ m ³ mol ⁻¹	$V^E \times 10^6$ m ³ mol ⁻¹	$G^{*E} \times 10^3$ N mol ⁻¹	d^1
0.0000	0.7241	0.4248	0.0000	101.0081	0.0000	0.0000	---
0.0754	0.7524	0.6270	0.0280	101.9249	-0.0276	153.5778	3.6482
0.1551	0.7807	0.8392	0.0480	103.0345	-0.0426	243.1822	3.0762
0.2393	0.8090	1.0514	0.0650	104.3281	-0.0625	287.9341	2.6245
0.3286	0.8373	1.2636	0.0750	105.8210	-0.0742	302.1603	2.2739
0.4233	0.8656	1.4758	0.0800	107.5098	-0.0846	293.3867	1.9961
0.5241	0.8939	1.6881	0.0823	109.4128	-0.0816	265.5892	1.7687
0.6314	0.9222	1.9002	0.0740	111.5308	-0.0739	221.1652	1.5783
0.7460	0.9505	2.1124	0.0600	113.8840	-0.0601	161.3846	1.4139
0.8685	0.9788	2.3246	0.0390	116.4810	-0.0382	86.9413	1.2627
1.0000	1.0073	2.5469	0.0000	119.3289	0.0000	0.0000	---

Table:4.2.2: Values of Density (ρ), Viscosity (η), Excess viscosity (η^E), Molar volume (V), Excess molar volume (V^E), Excess Gibbs free energy of activation of viscous flow (G^{*E}) and Grunberg-Nissan interaction parameter (d^1) for the binary liquid mixtures of methyl carbitol (MC) + Sec-Butyl amine (SBA) at 308.15 K.

Mole fraction of Methyl carbitol X_{MC}	$\rho \times 10^{-3}$ Kg m ⁻³	$\eta \times 10^3$ Kg m ⁻¹ s ⁻¹	$\eta^E \times 10^3$ Kg m ⁻¹ s ⁻¹	$V \times 10^5$ m ³ mol ⁻¹	$V^E \times 10^6$ m ³ mol ⁻¹	$G^{*E} \times 10^3$ N mol ⁻¹	d^1
0.0000	0.7084	0.3994	0.0000	103.2468	0.0000	0.0000	---
0.0877	0.7383	0.6142	0.0265	104.6555	-0.0246	164.5909	3.3487
0.1778	0.7682	0.8290	0.0478	106.1016	-0.0436	246.4497	2.7425
0.2705	0.7981	1.0438	0.0635	107.5927	-0.0625	282.7056	2.3291
0.3658	0.8280	1.2586	0.0736	109.1239	-0.0746	289.3862	2.0267
0.4639	0.8579	1.4734	0.0778	110.7019	-0.0765	274.6760	1.7933
0.5648	0.8878	1.6882	0.0759	112.3220	-0.0736	243.4884	1.6076
0.6688	0.9177	1.9030	0.0674	113.9956	-0.0635	198.6715	1.4547
0.7758	0.9476	2.1178	0.0524	115.7125	-0.0546	142.4288	1.3276
0.8862	0.9775	2.3326	0.0301	117.4881	-0.0312	75.8645	1.2193
1.0000	1.0073	2.5469	0.0000	119.3289	0.0000	0.0000	---

Table:4.2.3: Values of Density (ρ), Viscosity (η), Excess viscosity (η^E), Molar volume (V), Excess molar volume (V^E), Excess Gibbs free energy of activation of viscous flow (G^{*E}) and Grunberg-Nissan interaction parameter (d^1) for the binary liquid mixtures of methyl carbitol (MC) + Tert-Butyl amine (TBA) at 308.15 K.

Mole fraction of Methyl carbitol X_{MC}	$\rho \times 10^{-3}$ Kg m ⁻³	$\eta \times 10^3$ Kg m ⁻¹ s ⁻¹	$\eta^E \times 10^3$ Kg m ⁻¹ s ⁻¹	$V \times 10^5$ m ³ mol ⁻¹	$V^E \times 10^6$ m ³ mol ⁻¹	$G^{*E} \times 10^3$ N mol ⁻¹	d^1
0.0000	0.6809	0.4122	0.0000	107.4167	0.0000	0.0000	---
0.0909	0.7135	0.6257	0.0195	108.5042	-0.0185	154.5473	3.0479
0.1837	0.7461	0.8392	0.0349	109.6166	-0.0336	231.1164	2.5106
0.2784	0.7787	1.0527	0.0462	110.7506	-0.0456	264.5185	2.1438
0.3751	0.8113	1.2662	0.0533	111.9095	-0.0547	269.9079	1.8739
0.4737	0.8439	1.4797	0.0563	113.0849	-0.0554	255.4136	1.6666
0.5745	0.8765	1.6932	0.0546	114.2909	-0.0532	225.5368	1.5001
0.6775	0.9091	1.9067	0.0482	115.5243	-0.0477	183.3255	1.3633
0.7826	0.9417	2.1202	0.0374	116.7773	-0.0376	130.9417	1.2495
0.8901	0.9743	2.3337	0.0214	118.0623	-0.0224	69.5801	1.1525
1.0000	1.0073	2.5469	0.0000	119.3289	0.0000	0.0000	---

Table:4.2.4: Values of Density (ρ), Viscosity (η), Excess viscosity (η^E), Molar volume (V), Excess molar volume (V^E), Excess Gibbs free energy of activation of viscous flow (G^{*E}) and Grunberg-Nissan interaction parameter (d^1) for the binary liquid mixtures of methyl carbitol (MC) + N-Hexyl amine (NHA) at 308.15 K.

Mole fraction of Methyl carbitol X_{MC}	$\rho \times 10^{-3}$ Kg m ⁻³	$\eta \times 10^3$ Kg m ⁻¹ s ⁻¹	$\eta^E \times 10^3$ Kg m ⁻¹ s ⁻¹	$V \times 10^5$ m ³ mol ⁻¹	$V^E \times 10^6$ m ³ mol ⁻¹	$G^{*E} \times 10^3$ N mol ⁻¹	d^1
0.0000	0.7522	0.6001	0.0000	134.5254	0.0000	0.0000	---
0.1113	0.7777	0.7948	-0.0220	132.8350	0.0215	73.9875	1.2145
0.2199	0.8032	0.9895	-0.0387	131.1881	0.0365	112.3684	1.0625
0.3258	0.8287	1.1842	-0.0502	129.5806	0.0514	128.8472	0.9506
0.4291	0.8542	1.3789	-0.0566	128.0112	0.0542	130.7410	0.8642
0.5299	0.8797	1.5736	-0.0581	126.4788	0.0595	122.4173	0.7951
0.6284	0.9052	1.7683	-0.0552	124.9844	0.0543	106.6088	0.7380
0.7246	0.9307	1.9630	-0.0478	123.5249	0.0468	85.2828	0.6901
0.8185	0.9562	2.1577	-0.0359	122.0976	0.0347	59.8448	0.6499
0.9103	0.9817	2.3524	-0.0199	120.7037	0.0196	31.1908	0.6152
1.0000	1.0073	2.5469	0.0000	119.3289	0.0000	0.0000	---

Table:4.2.5: Values of Density (ρ), Viscosity (η), Excess viscosity (η^E), Molar volume (V), Excess molar volume (V^E), Excess Gibbs free energy of activation of viscous flow (G^{*E}) and Grunberg-Nissan interaction parameter (d^1) for the binary liquid mixtures of methyl carbitol (MC) + N-Octyl amine (NOA) at 308.15 K.

Mole fraction of Methyl carbitol X_{MC}	$\rho \times 10^{-3}$ Kg m ⁻³	$\eta \times 10^3$ Kg m ⁻¹ s ⁻¹	$\eta^E \times 10^3$ Kg m ⁻¹ s ⁻¹	$V \times 10^5$ m ³ mol ⁻¹	$V^E \times 10^6$ m ³ mol ⁻¹	$G^{*E} \times 10^3$ N mol ⁻¹	d^1
0.0000	0.7704	0.9263	0.0000	167.7181	0.0000	0.0000	---
0.1351	0.7941	1.0884	-0.0568	161.1796	0.0599	18.8911	0.2107
0.2600	0.8178	1.2505	-0.0972	155.1326	0.0965	29.1702	0.1930
0.3759	0.8415	1.4126	-0.1229	149.5224	0.1276	33.6304	0.1782
0.4837	0.8652	1.5747	-0.1355	144.3040	0.1364	34.1029	0.1658
0.5843	0.8888	1.7368	-0.1364	139.4526	0.1354	31.8219	0.1549
0.6783	0.9126	1.8989	-0.1267	134.8877	0.1312	27.4558	0.1456
0.7663	0.9363	2.0610	-0.1072	130.6265	0.1063	21.8000	0.1379
0.8490	0.9600	2.2231	-0.0791	126.6255	0.0786	15.1293	0.1307
0.9267	0.9837	2.3852	-0.0429	122.8631	0.0414	7.8273	0.1258
1.0000	1.0073	2.5469	0.0000	119.3289	0.0000	0.0000	---

Table:4.2.6: Values of Density (ρ), Viscosity (η), Excess viscosity (η^E), Molar volume (V), Excess molar volume (V^E), Excess Gibbs free energy of activation of viscous flow (G^{*E}) and Grunberg-Nissan interaction parameter (d^1) for the binary liquid mixtures of methyl carbitol (MC) + Cyclo Hexyl amine (CHA) at 308.15 K.

Mole fraction of Methyl carbitol X_{MC}	$\rho \times 10^{-3}$ Kg m ⁻³	$\eta \times 10^3$ Kg m ⁻¹ s ⁻¹	$\eta^E \times 10^3$ Kg m ⁻¹ s ⁻¹	$V \times 10^5$ m ³ mol ⁻¹	$V^E \times 10^6$ m ³ mol ⁻¹	$G^{*E} \times 10^3$ N mol ⁻¹	d^1
0.0000	0.8525	1.3245	0.0000	116.3284	0.0000	0.0000	---
0.0977	0.8680	1.4467	0.0028	116.6182	-0.0026	14.9256	0.2765
0.1960	0.8835	1.5689	0.0048	116.9121	-0.0042	25.2339	0.2614
0.2947	0.8990	1.6911	0.0064	117.2053	-0.0064	31.6409	0.2486
0.3939	0.9145	1.8133	0.0073	117.5000	-0.0073	34.6377	0.2370
0.4936	0.9300	1.9355	0.0076	117.7961	-0.0075	34.6424	0.2265
0.5939	0.9455	2.0577	0.0072	118.0959	-0.0069	31.9662	0.2166
0.6946	0.9610	2.1799	0.0063	118.3948	-0.0064	26.9511	0.2079
0.7959	0.9765	2.3021	0.0047	118.6972	-0.0045	19.7725	0.1995
0.8977	0.9920	2.4243	0.0025	119.0006	-0.0024	10.6596	0.1912
1.0000	1.0073	2.5469	0.0000	119.3289	0.0000	0.0000	---

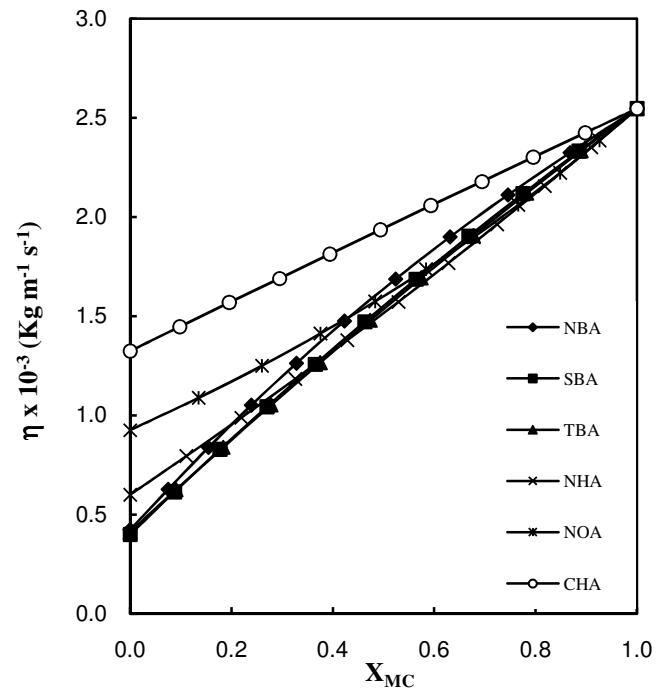


Fig:4.2.1: Plots of viscosities (η) for various amines vs mole fraction of methyl carbitol (X_{MC}) at 308.15 K.

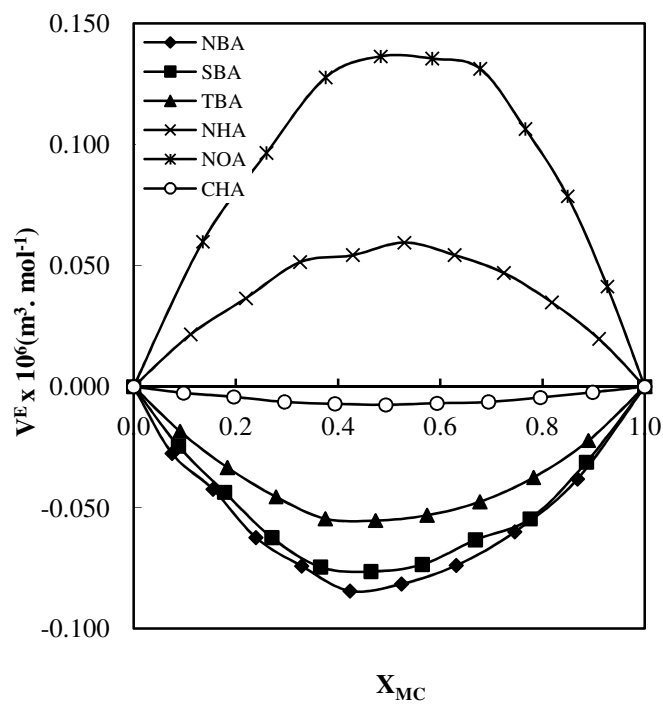


Fig:4.2.2: Plots of excess volumes (V^E) for various amines vs mole fraction of Methyl carbitol at 308.15 K

amines

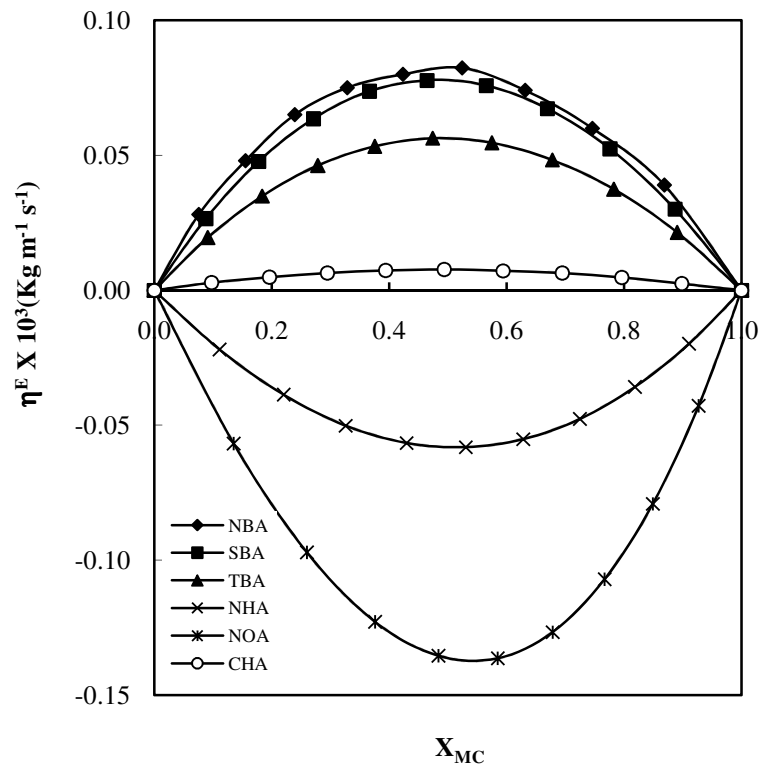


Fig:4.2.3: Plots of excess viscosities(η^E) for various glycols vs mole fraction of Methyl carbitol (X_{MC}) at 308.15 K.

amines

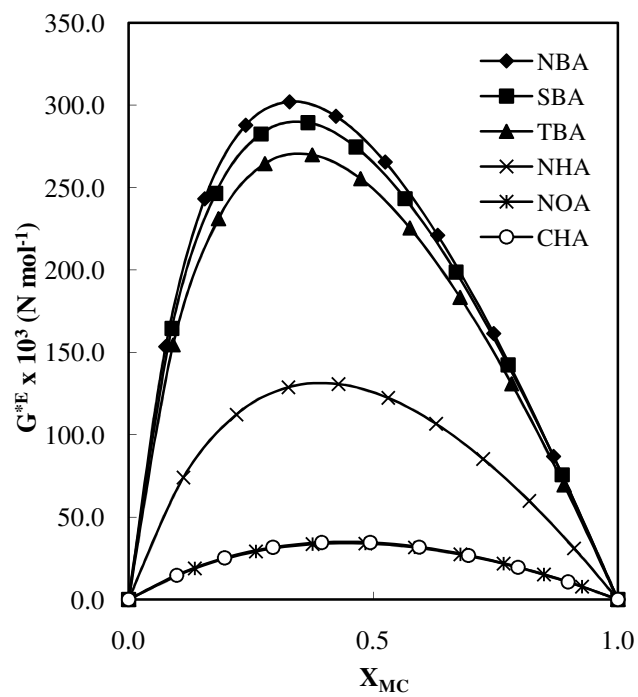


Fig:4.2.4: Plots of excess Gibbs free energy of activation (G^{*E}) of viscous flow for various amines Vs mole fractions of Methyl carbitol (X_{MC}) at 308.15 K.

Table:4.3.1: Values of Density (ρ), Viscosity (η), Excess viscosity (η^E), Molar volume (V), Excess molar volume (V^E), Excess Gibbs free energy of activation of viscous flow (G^{*E}) and Grunberg-Nissan interaction parameter (d^1) for the binary liquid mixtures of Ethyl carbitol (EC) + N-Butyl amine (NBA) at 308.15

K.

Mole fraction of Ethyl carbitol X_{EC}	$\rho \times 10^{-3}$ Kg m ⁻³	$\eta \times 10^3$ Kg m ⁻¹ s ⁻¹	$\eta^E \times 10^3$ Kg m ⁻¹ s ⁻¹	$V \times 10^5$ m ³ mol ⁻¹	$V^E \times 10^6$ m ³ mol ⁻¹	$G^{*E} \times 10^3$ N mol ⁻¹	d^1
0.0000	0.7241	0.4248	0.0000	101.0081	0.0000	0.0000	---
0.0754	0.7492	0.6590	0.0576	103.7662	-0.0576	184.6346	4.2729
0.1550	0.7743	0.8932	0.1055	106.6765	-0.1055	281.4020	3.4576
0.2393	0.7994	1.1274	0.1423	109.7629	-0.1423	328.7884	2.8993
0.3286	0.8245	1.3616	0.1674	113.0315	-0.1674	342.9765	2.4893
0.4233	0.8496	1.5958	0.1798	116.4948	-0.1798	332.0644	2.1730
0.5241	0.8747	1.8301	0.1781	120.1850	-0.1756	300.3106	1.9188
0.6314	0.8998	2.0642	0.1609	124.1102	-0.1596	250.2688	1.7097
0.7460	0.9249	2.2984	0.1268	128.3040	-0.1245	183.2367	1.5338
0.8685	0.9500	2.5326	0.0741	132.7837	-0.0721	99.9161	1.3845
1.0000	0.9751	2.7664	0.0000	137.5961	0.0000	0.0000	---

Table:4.3.2: Values of Density (ρ), Viscosity (η), Excess viscosity (η^E), Molar volume (V), Excess molar volume (V^E), Excess Gibbs free energy of activation of viscous flow (G^{*E}) and Grunberg-Nissan interaction parameter (d^1) for the binary liquid mixtures of Ethyl carbitol (EC) + Sec-Butyl amine (SBA) at 308.15 K.

Mole fraction of Ethyl carbitol X_{EC}	$\rho \times 10^{-3}$ Kg m ⁻³	$\eta \times 10^3$ Kg m ⁻¹ s ⁻¹	$\eta^E \times 10^3$ Kg m ⁻¹ s ⁻¹	$V \times 10^5$ m ³ mol ⁻¹	$V^E \times 10^6$ m ³ mol ⁻¹	$G^{*E} \times 10^3$ N mol ⁻¹	d^1
0.0000	0.7084	0.3994	0.0000	103.2468	0.0000	0.0000	---
0.0770	0.7351	0.6361	0.0544	105.8894	-0.0521	195.7015	4.4523
0.1580	0.7618	0.8728	0.0994	108.6673	-0.0892	295.0560	3.5783
0.2433	0.7885	1.1095	0.1342	111.5899	-0.1309	342.1638	2.9925
0.3334	0.8152	1.3462	0.1576	114.6803	-0.1522	354.6849	2.5645
0.4287	0.8419	1.5829	0.1688	117.9517	-0.1682	341.3894	2.2353
0.5295	0.8686	1.8196	0.1669	121.4085	-0.1621	307.2206	1.9738
0.6365	0.8953	2.0563	0.1503	125.0816	-0.1493	254.7236	1.7588
0.7501	0.9221	2.2931	0.1182	128.9650	-0.1153	185.5701	1.5794
0.8710	0.9487	2.5297	0.0686	133.1265	-0.0593	100.5905	1.4262
1.0000	0.9751	2.7664	0.0000	137.5961	0.0000	0.0000	---

Table:4.3.3: Values of Density (ρ), Viscosity (η), Excess viscosity (η^E), Molar volume (V), Excess molar volume (V^E), Excess Gibbs free energy of activation of viscous flow (G^{*E}) and Grunberg-Nissan interaction parameter (d^1) for the binary liquid mixtures of Ethyl carbitol (EC)+ Tert-Butyl amine (TBA) at 308.15 K.

Mole fraction of Methyl carbitol X_{MC}	$\rho \times 10^{-3}$ Kg m ⁻³	$\eta \times 10^3$ Kg m ⁻¹ s ⁻¹	$\eta^E \times 10^3$ Kg m ⁻¹ s ⁻¹	$V \times 10^5$ m ³ mol ⁻¹	$V^E \times 10^6$ m ³ mol ⁻¹	$G^{*E} \times 10^3$ N mol ⁻¹	d^1
0.0000	0.6809	0.4122	0.0000	107.4167	0.0000	0.0000	---
0.0798	0.7103	0.6476	0.0475	109.8271	-0.0448	185.1331	4.0840
0.1633	0.7397	0.8830	0.0864	112.3512	-0.0891	278.9215	3.3009
0.2507	0.7691	1.1184	0.1160	114.9918	-0.1158	322.7300	2.7733
0.3423	0.7986	1.3538	0.1358	117.7443	-0.1364	333.5106	2.3879
0.4384	0.8279	1.5892	0.1449	120.6614	-0.1429	320.0600	2.0915
0.5394	0.8573	1.8246	0.1425	123.7135	-0.1363	286.8759	1.8547
0.6456	0.8867	2.0600	0.1279	126.9211	-0.1265	236.9378	1.6605
0.7574	0.9161	2.2954	0.1001	130.2960	-0.1025	171.9656	1.4981
0.8754	0.9455	2.5308	0.0577	133.8611	-0.0542	92.8088	1.3590
1.0000	0.9751	2.7664	0.0000	137.5961	0.0000	0.0000	---

Table:4.3.4: Values of Density (ρ), Viscosity (η), Excess viscosity (η^E), Molar volume (V), Excess molar volume (V^E), Excess Gibbs free energy of activation of viscous flow (G^{*E}) and Grunberg-Nissan interaction parameter (d^1) for the binary liquid mixtures of Ethyl carbitol (EC) + N-Hexyl amine (NHA) at 308.15 K.

Mole fraction of Ethyl carbitol X_{EC}	$\rho \times 10^{-3}$ Kg m ⁻³	$\eta \times 10^3$ Kg m ⁻¹ s ⁻¹	$\eta^E \times 10^3$ Kg m ⁻¹ s ⁻¹	$V \times 10^5$ m ³ mol ⁻¹	$V^E \times 10^6$ m ³ mol ⁻¹	$G^{*E} \times 10^3$ N mol ⁻¹	d^1
0.0000	0.7522	0.6001	0.0000	134.5254	0.0000	0.0000	---
0.0980	0.7745	0.8167	0.0043	134.8251	-0.0039	97.0299	1.7924
0.1964	0.7968	1.0330	0.0074	135.1246	-0.0073	148.8281	1.5399
0.2953	0.8191	1.2493	0.0095	135.4279	-0.0095	172.7061	1.3552
0.3946	0.8414	1.4656	0.0107	135.7308	-0.0107	177.5589	1.2137
0.4944	0.8639	1.6819	0.0108	136.0057	-0.0107	168.3199	1.1005
0.5946	0.8860	1.8982	0.0100	136.3430	-0.0102	148.7647	1.0078
0.6953	0.9083	2.1145	0.0082	136.6520	-0.0080	120.5991	0.9296
0.7964	0.9306	2.3308	0.0055	136.9603	-0.0052	85.6050	0.8624
0.8979	0.9529	2.5471	0.0019	137.2681	-0.0018	44.9278	0.8012
1.0000	0.9751	2.7664	0.0000	137.5961	0.0000	0.0000	---

Table:4.3.5: Values of Density (ρ), Viscosity (η), Excess viscosity (η^E), Molar volume (V), Excess molar volume (V^E), Excess Gibbs free energy of activation of viscous flow (G^{*E}) and Grunberg-Nissan interaction parameter (d^1) for the binary liquid mixtures of Ethyl carbitol (EC) + N-Octyl amine (NOA) at 308.15

K.

Mole fraction of Ethyl carbitol X_{EC}	$\rho \times 10^{-3}$ Kg m ⁻³	$\eta \times 10^3$ Kg m ⁻¹ s ⁻¹	$\eta^E \times 10^3$ Kg m ⁻¹ s ⁻¹	$V \times 10^5$ m ³ mol ⁻¹	$V^E \times 10^6$ m ³ mol ⁻¹	$G^{*E} \times 10^3$ N mol ⁻¹	d^1
0.0000	0.7704	0.9263	0.0000	167.7181	0.0000	0.0000	---
0.1193	0.7909	1.1103	-0.0355	164.1190	0.0354	112.1496	1.7248
0.2336	0.8114	1.2943	-0.0618	160.6713	0.0624	206.9198	1.8689
0.3432	0.8319	1.4783	-0.0795	157.3654	0.0727	288.8857	2.0741
0.4483	0.8524	1.6623	-0.0889	154.1924	0.0884	361.0009	2.3647
0.5493	0.8729	1.8463	-0.0908	151.1451	0.0901	425.3189	2.7866
0.6464	0.8934	2.0303	-0.0854	148.2160	0.0854	483.2902	3.4339
0.7398	0.9139	2.2143	-0.0733	145.3982	0.0765	535.9917	4.5281
0.8298	0.9344	2.3983	-0.0549	142.6860	0.0515	584.2606	6.7371
0.9164	0.9549	2.5823	-0.0303	140.0726	0.0313	628.7123	13.3848
1.0000	0.9751	2.7664	0.0000	137.5961	0.0000	0.0000	---

Table:4.3.6: Values of Density (ρ), Viscosity (η), Excess viscosity (η^E), Molar volume (V), Excess molar volume (V^E), Excess Gibbs free energy of activation of viscous flow (G^{*E}) and Grunberg-Nissan interaction parameter (d^1) for the binary liquid mixtures of Ethyl carbitol (EC) + Cyclo Hexyl amine (CHA) at 308.15 K.

Mole fraction of Ethyl carbitol X_{EC}	$\rho \times 10^{-3}$ Kg m ⁻³	$\eta \times 10^3$ Kg m ⁻¹ s ⁻¹	$\eta^E \times 10^3$ Kg m ⁻¹ s ⁻¹	$V \times 10^5$ m ³ mol ⁻¹	$V^E \times 10^6$ m ³ mol ⁻¹	$G^{*E} \times 10^3$ N mol ⁻¹	d^1
0.0000	0.8525	1.3245	0.0000	116.3284	0.0000	0.0000	---
0.0859	0.8648	1.4687	0.0203	118.1504	-0.0214	25.2301	0.5105
0.1745	0.8771	1.6129	0.0368	120.0291	-0.0354	43.1754	0.4755
0.2660	0.8894	1.7571	0.0491	121.9699	-0.0461	54.7613	0.4442
0.3605	0.9017	1.9013	0.0570	123.9742	-0.0590	60.7052	0.4164
0.4581	0.9140	2.0455	0.0605	126.0432	-0.0612	61.5534	0.3917
0.5591	0.9263	2.1897	0.0590	128.1858	-0.0586	57.6533	0.3690
0.6636	0.9386	2.3339	0.0526	130.4027	-0.0515	49.3307	0.3484
0.7718	0.9509	2.4781	0.0407	132.6985	-0.0412	36.8031	0.3295
0.8838	0.9632	2.6223	0.0234	135.0737	-0.0216	20.2702	0.3125
1.0000	0.9751	2.7664	0.0000	137.5961	0.0000	0.0000	---

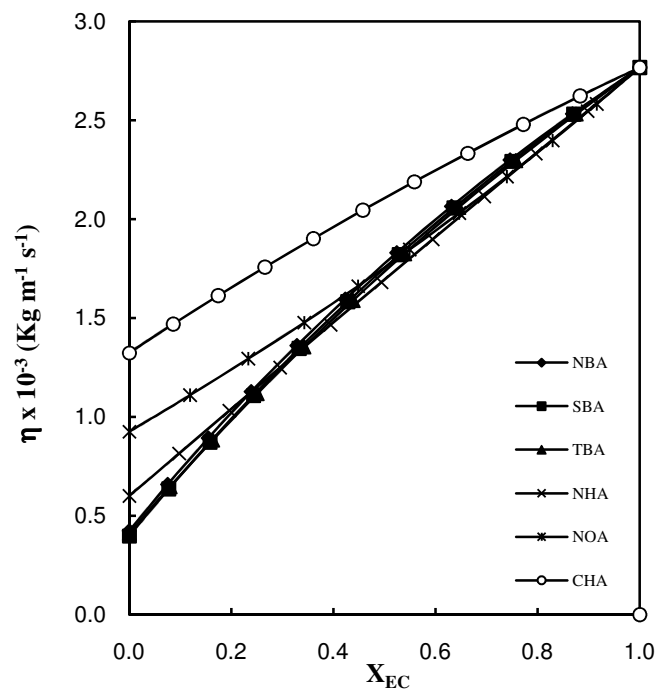


Fig:4.3.1: Plots of viscosities (η) for various amines vs mole fractions of Ethyl carbitol (X_{EC}) at 308.15 K.

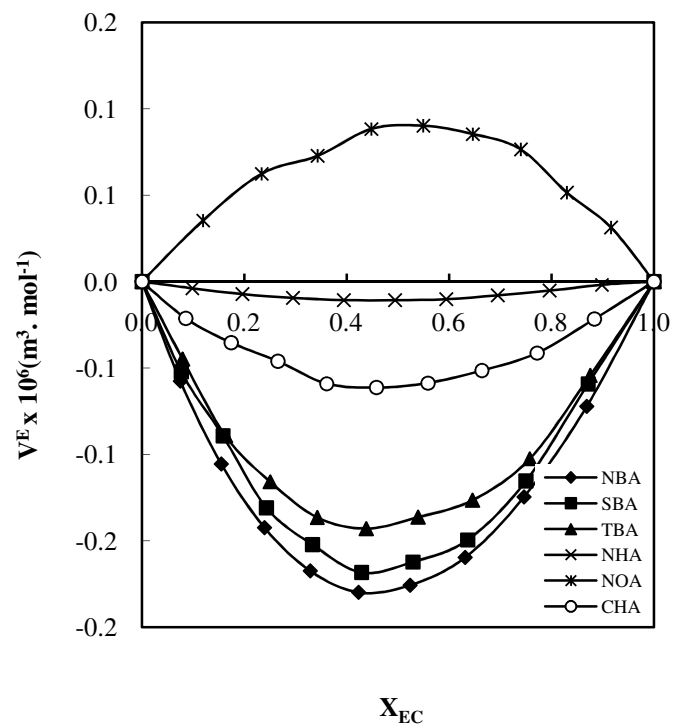


Fig:4.3.2: Plots of excess volumes (V^E) for various amines vs mole fraction of Ethyl carbitol (X_{EC}) at 308.15 K.

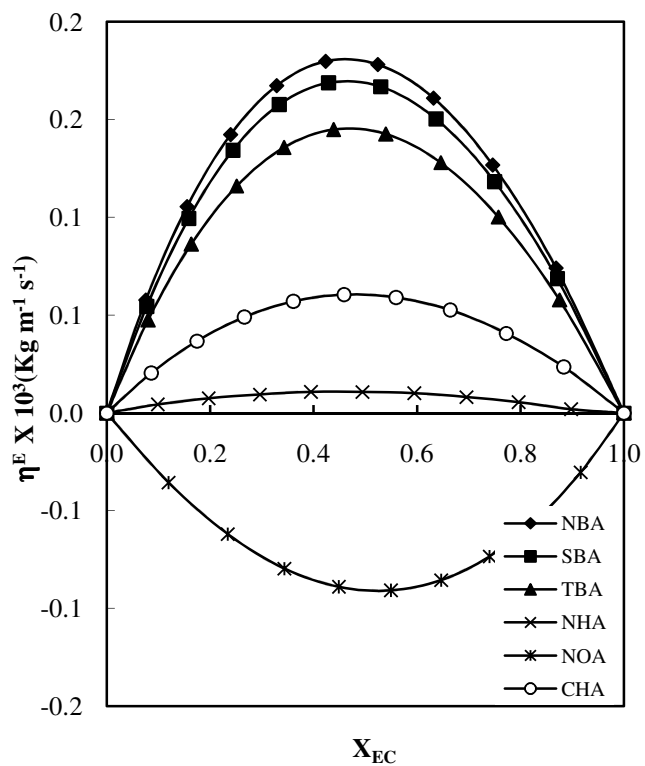


Fig:4.3.3: Plots of excess viscosities(η^E) for various glycols vs mole fractions of Ethyl carbitol (X_{EC}) at 308.15 K.

amines

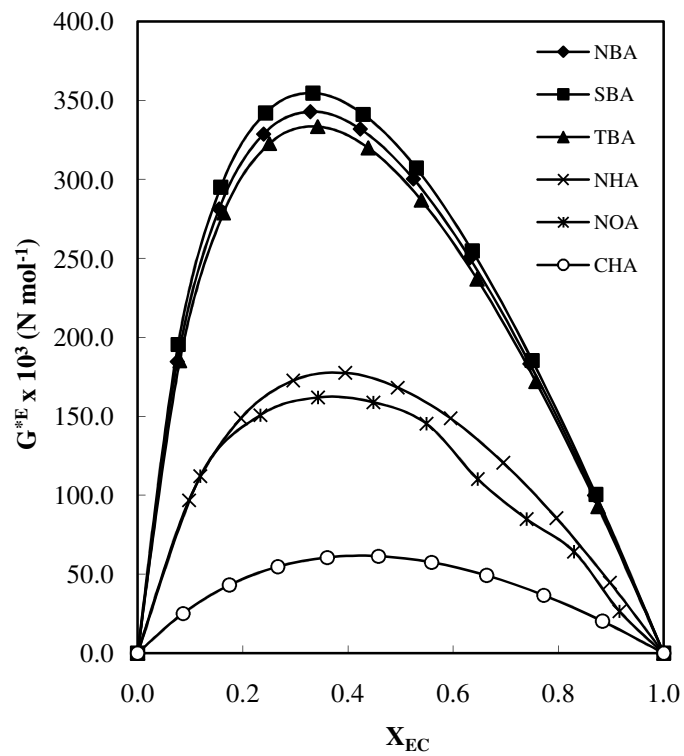


Fig:4.3.4: Plots of excess Gibbs free energy of activation of viscous flow (G^{*E}) for various amines vs mole fraction of ethyl carbitol (X_{EC}) at 308.15 K.