Supplementary Information

Evaluation of the Vaporization Enthalpies and Liquid Vapor Pressures of (R)-Deprenyl, (S)-Benzphetamine, Alverine and a Series of Aliphatic Tertiary Amines by Correlation Gas at T/K = 298.15 Chromatography.

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TABLE S1. Solid-Solid Phase Transition **and** Fusion Enthalpy of Tribenzylamine

mg	$\Delta_{cr}^{cr}H_t(T_t)$/J·mol^{-1}	T_t/K	$\Delta_{cr}^{l}H_t(T_{fus})$/J·mol^{-1}	T_{fus}/K
13.51	1073.7	342.1	22535	365.5
14.48	1040.1	342.7	23272	365.7
13.26	1198.5	342.8	23278	365.7
Avg	1104.1±80	342.5±0.4	23028±100	365.6±0.1

TABLE S2A. Experimental Retention Times of Some Simple Tertiary Amines

Run 1	372.6	377.7	382.8	387.9	393.1	398.2	403.4
t_o = 60 s				t/t_o			
diethyl ether	2.582	2.600	2.616	2.627	2.657	2.677	2.710
triethylamine	2.869	2.854	2.841	2.829	2.837	2.839	2.857
tripropylamine	4.437	4.181	3.969	3.795	3.669	3.559	3.485
N,N-dimethylbenzylamine	6.853	6.199	5.66	5.226	4.888	4.600	4.383
triisobutylamine	7.407	6.625	5.986	5.476	5.079	4.746	4.494
N,N-dimethyloctylamine	8.779	7.719	6.865	6.187	5.660	5.222	4.889
tri-n-butanamine	13.496	11.500	9.907	8.664	7.688	6.890	6.275

TABLE S2B. Evaluation of the Vaporization Enthalpy of Tributylamine and Triisobutylamine

Run 1	- slope	intercept	ΔH_{trn}(388 K)	$\Delta_l^g H_m$(298 K)	$\Delta_l^g H_m$(298 K)
	T/K		kJ·mol^{-1}	kJ·mol^{-1} (lit)	kJ·mol^{-1}(calc)
triethylamine	3262.0	10.009	27.12	35.2±0.2	35.4±1.8
tripropylamine	4263.8	10.833	35.45	46.2±0.1	46.0±2.0
N,N-dimethylbenzylamine	4577.9	10.842	38.06	49.7±0.4	49.3±2.0
triisobutylamine	4858.8	11.475	40.39		52.3±2.1
N,N-dimethyloctylamine	5104.6	11.885	42.44	54.5±0.5	54.9±2.2
tri-n-butylamine	5464.5	12.285	45.43		58.7±2.3

$$\Delta_l^g H_m(298.15\ K)/kJ\cdot mol^{-1} = (1.27 \pm 0.04)\Delta H_{trn}(388\ K) + (0.91 \pm 1.4) \quad r^2 = 0.9981 \qquad (S1)$$

TABLE S3A. Experimental Retention Times of Some Simple Tertiary Amines

Run 2	372.8	377.8	382.8	388	393.1	398.3	403.5
t_o = 60 s				t/t_o			
diethyl ether	2.603	2.616	2.611	2.651	2.669	2.682	2.714
triethylamine	2.893	2.873	2.837	2.854	2.85	2.847	2.862
tripropylamine	4.472	4.209	3.964	3.827	3.686	3.569	3.49
N,N-dimethylbenzylamine	6.906	6.238	5.655	5.267	4.908	4.615	4.389
triisobutylamine	7.47	6.67	5.98	5.522	5.102	4.763	4.502
N,N-dimethyloctylamine	8.849	7.769	6.856	6.235	5.683	5.24	4.895
tri-n-butylamine	13.617	11.585	9.899	8.736	7.723	6.921	6.287

TABLE S3B. Evaluation of the Vaporization Enthalpy of Tributylamine and Triisobutylamine

Run 2	- slope	intercept	ΔH_{trn}(388 K)	$\Delta_l^g H_m$(298 K)	$\Delta_l^g H_m$(298 K)
	T/K		kJ·mol^{-1}	kJ·mol^{-1} (lit)	kJ·mol^{-1}(calc)
triethylamine	3282.7	10.052	27.29	35.2±0.2	35.4±1.8
tripropylamine	4290.7	10.895	35.67	46.2±0.1	46.0±2.0
N,N-dimethylbenzylamine	4609	10.916	38.32	49.7±0.4	49.3±2.1
triisobutylamine	4892.4	11.553	40.67		52.3±2.2
N,N-dimethyloctylamine	5140.7	11.971	42.74	54.5±0.5	54.9±2.2
tri-n-butylamine	5500.2	12.368	45.73		58.7±2.3

$$\Delta_l^g H_m(298.15\ \text{K})/\text{kJ·mol}^{-1} = (1.26 \pm 0.04)\Delta H_{trn}(388\ \text{K}) + (0.98 \pm 1.4) \quad r^2 = 0.9981 \qquad \text{(S2)}$$

TABLE S4A. Experimental Retention Times of Some Simple Tertiary Amines

Run 3	424.3	429.3	434.4	439.4	444.3	449.3	454.3
t_o = 60 s				t/t_o			
hexanes	2.687	2.698	2.718	2.733	2.746	2.766	2.788
N,N-dimethylbenzylamine	3.59	3.496	3.424	3.362	3.308	3.27	3.240
N,N-dimethyloctylamine	3.802	3.670	3.567	3.480	3.405	3.350	3.306
tri-n-butylamine	4.454	4.222	4.038	3.884	3.752	3.650	3.566
N,N-dimethyldodecylamine	11.502	10.011	8.824	7.869	7.086	6.451	5.931
N,N-dimethyltetradecylamine	26.556	22.015	18.463	15.672	13.436	11.646	10.202

TABLE S4B. Evaluation of the Vaporization Enthalpy of Tributylamine and N,N-dimethyltetradecanamime

Run 3	- slope	intercept	ΔH_{trn}(439 K)	$\Delta_l^g H_m$(298 K)	$\Delta_l^g H_m$(298 K)
	T/K		kJ·mol^{-1}	kJ·mol^{-1} (lit)	kJ·mol^{-1}(calc)
N,N-dimethylbenzylamine	4436.7	10.561	36.89	49.7±0.4	49.9±1.5
N,N-dimethyloctylamine	4923.4	11.498	40.93	54.5±0.5	54.2±1.5
tri-n-butylamine	5268.0	11.850	43.8		57.3±1.6
N,N-dimethyldodecylamine	6621.9	13.435	55.05	69.3±0.3	69.4±1.8
N,N-dimethyltetradecylamine	7509.0	14.530	62.43		77.3±1.9

$$\Delta_l^g H_m(298.15\ \text{K})/\text{kJ·mol}^{-1} = (1.07 \pm 0.03)\Delta H_{trn}(439\ \text{K}) + (10.4 \pm 1.1) \quad r^2 = 0.9995 \qquad \text{(S3)}$$

TABLE S5A. Experimental Retention Times of Some Simple Tertiary Amines

Run 4	424.3	429.3	434.4	439.3	444.3	449.3	454.3
t_o = 60 s				t/t_o			
hexanes	2.732	2.731	2.723	2.742	2.742	2.767	2.777
triethylamine	3.649	3.536	3.433	3.372	3.304	3.270	3.228
tripropylamine	3.865	3.712	3.576	3.490	3.401	3.349	3.294
N,N-dimethylbenzylamine	4.527	4.270	4.049	3.895	3.749	3.649	3.553
triisobutylamine	11.685	10.114	8.853	7.888	7.082	6.446	5.913
N,N-dimethyloctylamine	26.948	22.209	18.527	15.698	13.431	11.632	10.171

TABLE S5B. Evaluation of the Vaporization Enthalpy of Tributylamine and N,N-dimethyltetradecanamime

Run 4	- slope	intercept	ΔH_{trn}(439 K)	$\Delta_l^g H_m$(298 K)	$\Delta_l^g H_m$(298 K)
	T/K		kJ·mol^{-1}	kJ·mol^{-1} (lit)	kJ·mol^{-1}(calc)
N,N-dimethylbenzylamine	4544.8	10.804	37.78	49.7±0.4	49.9±1.4
N,N-dimethyloctylamine	5035.8	11.75	41.87	54.5±0.5	54.3±1.4
tri-n-butylamine	5379.9	12.101	44.73		57.3±1.5
N,N-dimethyldodecylamine	6732.9	13.685	55.98	69.3±0.3	69.4±1.7
N,N-dimethyltetradecylamine	7613.6	14.766	63.3		77.2±1.8

$$\Delta_l^g H_m(298.15\ \text{K})/\text{kJ·mol}^{-1} = (1.07 \pm 0.02)\Delta H_{trn}(439\ \text{K}) + (11.4 \pm 0.45) \qquad r^2 = 0.9995 \qquad \text{(S4)}$$

TABLE S6A. Experimental Retention Times of Some Simple Tertiary Amines

Run 5	423.5	429	434	439.2	444.4	449.5	454.7
t_o = 60 s				t/t_o			
hexanes	0.552	0.552	0.555	0.557	0.556	0.562	0.568
N,N-dimethyloctylamine	1.211	1.128	1.061	1.002	0.949	0.915	0.882
tributylamine	1.609	1.466	1.35	1.249	1.161	1.1	1.043
N,N-dimethyldodecylamine	5.409	4.596	3.945	3.411	2.969	2.635	2.343
N,N-dimethyltetradecylamine	13.311	10.914	9.038	7.539	6.329	5.413	4.635
N,N-dimethylhexadecylamine	33.677	26.826	21.545	17.446	14.208	11.786	9.784

TABLE S6B. Evaluation of the Vaporization Enthalpy of N,N-Dimethylhexadecylamine

Run 5	- slope	intercept	ΔH_{trn}(439 K)	$\Delta_l^g H_m$(298 K)	$\Delta_l^g H_m$(298 K)
	T/K		kJ·mol^{-1}	kJ·mol^{-1} (lit)	kJ·mol^{-1}(calc)
N,N-dimethyloctylamine	4588.7	11.254	38.15	54.5±0.5	54.6±0.8
tri-n-butylamine	4949.2	11.633	41.15	58.0±1.9	57.8±0.9
N,N-dimethyldodecylamine	6240.3	13.157	51.88	69.3±0.3	69.5±1.0
N,N-dimethyltetradecylamine	7084.6	14.185	58.9	77.3±1.9	77.2±1.0
N,N-dimethylhexadecylamine	7930.6	15.228	65.93		84.8±1.1

$$\Delta_l^g H_m(298.15\ \text{K})/\text{kJ·mol}^{-1} = (1.09\pm0.013)\Delta H_{trn}(439\ \text{K}) - (13.0\pm0.6) \qquad r^2 = 0.9997 \qquad \text{(S5)}$$

TABLE S7A. Experimental Retention Times of Some Simple Tertiary Amines

Run 6	423.6	428.9	434	439.2	444.4	449.5	454.7
t_o = 60 s				t/t_o			
hexanes	0.547	0.554	0.551	0.554	0.561	0.563	0.565
N,N-dimethyloctylamine	1.199	1.127	1.056	1	0.958	0.915	0.88
tri-n-butylamine	1.593	1.463	1.344	1.247	1.172	1.101	1.041
N,N-dimethyldodecylamine	5.359	4.581	3.935	3.412	2.993	2.636	2.341
N,N-dimethyltetradecylamine	13.199	10.875	9.02	7.544	6.378	5.416	4.636
N,N-dimethylhexadecylamine	33.443	26.707	21.502	17.451	14.314	11.792	9.788

TABLE S7B. Evaluation of the Vaporization Enthalpy of N,N-Dimethylhexadecylamine

Run 6	- slope	intercept	ΔH_{trn}(439 K)	$\Delta_l^g H_m$(298 K)	$\Delta_l^g H_m$(298 K)
	T/K		kJ·mol^{-1}	kJ·mol^{-1} (lit)	kJ·mol^{-1}(calc)
N,N-dimethyloctylamine	4521.7	11.103	37.59	54.5±0.5	54.6±0.8
tri-n-butylamine	4886.1	11.491	40.62	58.0±1.9	57.8±0.8
N,N-dimethyldodecylamine	6181.1	13.023	51.39	69.3±0.3	69.5±0.9
N,N-dimethyltetradecylamine	7029.2	14.059	58.44	77.3±1.9	77.2±0.8
N,N-dimethylhexadecylamine	7880.6	15.115	65.52		84.8±0.9

$$\Delta_l^g H_m(298.15\ \text{K})/\text{kJ·mol}^{-1} = (1.07\pm0.019)\Delta H_{trn}(439\ \text{K}) - (13.0\pm0.6) \quad r^2 = 0.9997 \quad \text{(S6)}$$

TABLE S8A. Experimental Retention Times of Some Simple Tertiary Amines

Run 7	484.9	489.9	494.6	500	505.2	510.3	515.5
t_o = 60 s				t/t_o			
methylene chloride	2.975	2.985	3.009	3.021	3.048	3.065	3.08
tri-n-butylamine	3.384	3.352	3.342	3.323	3.324	3.316	3.31
N,N-dimethyldodecylamine	4.335	4.179	4.068	3.957	3.883	3.808	3.746
N,N-dimethyltetradecylamine	5.807	5.437	5.151	4.883	4.679	4.498	4.346
N,N-dimethylhexadecylamine	8.797	7.951	7.277	6.669	6.189	5.784	5.447
tri-n-octylamine	25.496	21.604	18.514	15.85	13.748	12.056	10.687
tribenzylamine	25.967	22.296	19.346	16.789	14.708	13.013	11.618

TABLE S8B. Evaluation of the Vaporization Enthalpy of Tri-n-octylamine and Tribenzylamine

Run 7	- slope	intercept	ΔH_{trn}(500 K)	$\Delta_l^g H_m$(298 K)	$\Delta_l^g H_m$(298 K)
	T/K		kJ·mol^{-1}	kJ·mol^{-1} (lit)	kJ·mol^{-1}(calc)
tri-n-butylamine	4655.4	10.504	38.7	58.0±1.9	58.0±0.9
N,N-dimethyldodecylamine	5808.2	11.679	48.29	69.3±0.3	69.5±1.0
N,N-dimethyltetradecylamine	6566.2	12.508	54.59	77.3±1.9	77.1±1.0
N,N-dimethylhexadecylamine	7350.8	13.405	61.11	84.8±1.0	84.9±1.1
tri-n-octylamine	8871.4	15.189	73.75		100.1±1.2
tribenzylamine	8091.0	13.559	67.27		92.3±1.2

$$\Delta_l^g H_m(298.15\ \text{K})/\text{kJ·mol}^{-1} = (1.20\pm0.013)\Delta H_{trn}(500\ \text{K}) + (11.5\pm0.7) \quad r^2 = 0.9997 \quad \text{(S7)}$$

TABLE S9A. Evaluation of the Vaporization Enthalpy of Tri-n-octylamine and Tribenzylamine

Run 8	484.9	489.9	494.8	500.1	505.2	510.4	515.5
t_o = 60 s				t/t_o			
methylene chloride	2.971	2.989	2.992	3.025	3.034	3.051	3.076
tri-n-butylamine	3.382	3.363	3.331	3.334	3.315	3.307	3.31
N,N-dimethyldodecylamine	4.335	4.193	4.057	3.971	3.876	3.803	3.752
N,N-dimethyltetradecylamine	5.802	5.447	5.13	4.889	4.669	4.488	4.35
N,N-dimethylhexadecylamine	8.797	7.956	7.232	6.669	6.171	5.765	5.445
tri-n-octylamine	25.512	21.549	18.351	15.818	13.725	12.027	10.66
tribenzylamine	25.972	22.266	19.221	16.738	14.684	12.981	11.592

TABLE S9B. Evaluation of the Vaporization Enthalpy of Tri-n-octylamine and Tribenzylamine

Run 8	- slope	intercept	ΔH_{trn}(500 K)	$\Delta_l^g H_m$(298 K)	$\Delta_l^g H_m$(298 K)
	T/K		kJ·mol^{-1}	kJ·mol^{-1} (lit)	kJ·mol^{-1}(calc)
tri-n-butylamine	4592.7	10.362	38.18	58.0±1.9	58.1±1.1
N,N-dimethyldodecylamine	5731.7	11.516	47.65	69.3±0.3	69.3±1.2
N,N-dimethyltetradecylamine	6522.6	12.418	54.23	77.3±1.9	77±1.3
N,N-dimethylhexadecylamine	7346.4	13.396	61.08	84.8±1.0	85±1.4
tri-n-octylamine	8872.4	15.192	73.76		100±1.6
tribenzylamine	8097.3	13.572	67.32		92.4±1.5

$$\Delta_l^g H_m(298.15\ \text{K})/\text{kJ·mol}^{-1} = (1.18\pm0.017)\Delta H_{trn}(500\ \text{K}) + (13.2\pm0.9) \quad r^2 = 0.9996 \quad \text{(S8)}$$

TABLE S10A. Experimental Retention Times of Some Simple Tertiary Amines

Run 9	403.5	408.7	413.8	418.8	424	429.1	434.1
t_o = 60 s				t/t_o			
hexane/diethyl ether	2.673	2.694	2.703	2.718	2.731	2.75	2.78
triisobutylamine	4.439	4.214	4.021	3.857	3.723	3.609	3.545
N,N-dimethyloctylamine	4.827	4.535	4.289	4.080	3.913	3.779	3.686
tributylamine	6.206	5.68	5.247	4.879	4.586	4.347	4.175
L- deprenyl	16.55	14.129	12.210	10.638	9.35	8.325	7.546
N,N-dimethyldodecylamine	23.424	19.460	16.386	13.909	11.921	10.353	9.181

TABLE S10B. Evaluation of the Vaporization Enthalpy of L- Deprenyl

Run 9	- slope	intercept	ΔH_{trn}(419 K)	$\Delta_l^g H_m$(298 K)	$\Delta_l^g H_m$(298 K)
	T/K		kJ·mol^{-1}	kJ·mol^{-1} (lit)	kJ·mol^{-1}(calc)
N,N-dimethylbenzylamine	4429.0	10.477	36.82	49.7±0.4	49.9±1.4
N,N-dimethyloctylamine	4977.6	11.572	41.38	54.5±0.5	54.5±1.5
tributylamine	5344.6	13.720	56.19	58.0±1.9	57.6±1.5
L- deprenyl	6141.9	11.986	44.43		64.3±1.6
N,N-dimethyldodecylamine	6758.5	12.594	51.06	69.3±0.3	69.5±1.7

$$\Delta_l^g H_m(298.15\ \text{K})/\text{kJ·mol}^{-1} = (1.01\pm0.02)\Delta H_{trn}(419\ \text{K}) + (12.8\pm1.1) \quad r^2 = 0.9989 \quad \text{(S9)}$$

TABLE S11A. Experimental Retention Times of Some Simple Tertiary Amines
deprenyl-1.xls

Run 10	424	429.1	434.1	439.1	444	449	454
t_o = 60 s				t/t_o			
hexane/diethyl ether	2.727	2.748	2.765	2.783	2.804	2.824	2.84
N,N-dimethylbenzylamine	3.687	3.597	3.519	3.456	3.405	3.364	3.325
N,N-dimethyloctylamine	3.905	3.775	3.665	3.576	3.505	3.446	3.392
tributylamine	4.573	4.341	4.148	3.99	3.861	3.753	3.658
L- deprenyl	9.3	8.299	7.481	6.815	6.264	5.807	5.42
N,N-dimethyldodecylamine	11.803	10.282	9.061	8.082	7.283	6.628	6.083

TABLE S11B. Evaluation of the Vaporization Enthalpy of L- Deprenyl

Run 10	- slope	intercept	ΔH_{trn}(439 K)	$\Delta_l^g H_m$(298 K)	$\Delta_l^g H_m$(298 K)
	T/K		kJ·mol^{-1}	kJ·mol^{-1} (lit)	kJ·mol^{-1}(calc)
N,N-dimethylbenzylamine	4382.6	10.378	36.44	49.7±0.4	50.1±2.3
N,N-dimethyloctylamine	4858.8	11.298	40.39	54.5±0.5	54.2±2.4
tributylamine	5220.4	11.702	43.40	58.0±1.9	57.4±2.5
L- deprenyl	6005.8	12.284	49.93		64.2±2.7
N,N-dimethyldodecylamine	6607.9	13.382	54.94	69.3±0.3	69.5±2.8

$\Delta_l^g H_m$(298.15 K)/kJ·mol^{-1} = (1.05±0.04)ΔH_{trn}(439 K) + (12.0±1.8) r^2 = 0.9971 (S10)

TABLE S12A. Experimental Retention Times of Some Simple Tertiary Amines

Run 11	475.6	480.4	485.7	490.5	495.7	500.9	506.2
t_o = 60 s				t/t_o			
diethyl ether	2.803	2.79	2.767	2.719	2.67	2.649	2.649
N,N-dimethylbenzylamine	3.125	3.082	3.032	2.957	2.884	2.843	2.828
N,N-dimethyldodecylamine	4.555	4.307	4.082	3.851	3.647	3.503	3.404
N,N-dimethyltetradecylamine	6.607	6.026	5.521	5.05	4.647	4.349	4.129
(S)-benzphetamine	10.156	9.045	8.088	7.22	6.488	5.934	5.515
N,N-dimethylhexadecylamine	10.955	9.604	8.463	7.454	6.622	5.991	5.515
tribenzylamine	36.263	30.345	25.436	21.227	17.908	15.344	13.373

TABLE S12B. Evaluation of the Vaporization Enthalpy of (S)-Benzphetamine

Run 11	- slope	intercept	ΔH_{trn}(491 K)	$\Delta_l^g H_m$(298 K)	$\Delta_l^g H_m$(298 K)
	T/K		kJ·mol^{-1}	kJ·mol^{-1} (lit)	kJ·mol^{-1}(calc)
N,N-dimethylbenzylamine	4694.1	11.003	39.02	49.7±0.4	49.7±0.5
N,N-dimethyldodecylamine	6689.0	13.508	55.61	69.3±0.3	69.3±0.6
N,N-dimethyltetradecylamine	7498.9	14.436	62.34	77.3±1.9	77.2±0.6
(S)-benzphetamine	7493.5	13.766	62.3		77.1±0.6
N,N-dimethylhexadecylamine	8302.2	15.364	69.02	84.8±1.0	85.1±0.6
tribenzylamine	9034.0	15.491	75.11	92.4±1.4	92.3±0.7

$\Delta_l^g H_m$(298.15 K)/kJ·mol^{-1} = (1.18±0.01)ΔH_{trn}(491 K) + (3.69±0.4) r^2 = 0.9999 (S11)

TABLE S13A. Experimental Retention Times of Some Simple Tertiary Amines

Run 12	475.6	480.4	485.7	490.5	495.7	500.9	506.2
t_o = 60 s				t/t_o			
diethyl ether	2.803	2.79	2.767	2.719	2.67	2.649	2.649
N,N-dimethylbenzylamine	3.125	3.082	3.032	2.957	2.884	2.843	2.828
N,N-dimethyldodecylamine	4.555	4.307	4.082	3.851	3.647	3.503	3.404
N,N-dimethyltetradecylamine	6.607	6.026	5.521	5.05	4.647	4.349	4.129
(S)-benzphetamine	10.156	9.045	8.088	7.22	6.488	5.934	5.515
N,N-dimethylhexadecylamine	10.955	9.604	8.463	7.454	6.622	5.991	5.515
tribenzylamine	36.263	30.345	25.436	21.227	17.908	15.344	13.373

TABLE S13B. Evaluation of the Vaporization Enthalpy of (S)-Benzphetamine

Run 12	- slope	intercept	ΔH_{trn}(419 K)	$\Delta_l^g H_m$(298 K)	$\Delta_l^g H_m$(298 K)
	T/K		kJ·mol^{-1}	kJ·mol^{-1} (lit)	kJ·mol^{-1}(calc)
N,N-dimethylbenzylamine	4712.5	11.046	39.18	49.7±0.4	49.6±0.6
N,N-dimethyldodecylamine	6752.2	13.645	56.14	69.3±0.3	69.4±0.7
N,N-dimethyltetradecylamine	7569.9	14.59	62.93	77.3±1.9	77.2±0.7
(S)-benzphetamine	7563.5	13.918	62.88		77.3±0.7
N,N-dimethylhexadecylamine	8373.4	15.518	69.61	84.8±1.0	85.1±0.7
tribenzylamine	9103.8	15.642	75.69	92.4±1.4	92.1±0.8

$\Delta_l^g H_m$(298.15 K)/kJ·mol^{-1} = (1.16±0.01)ΔH_{trn}(419 K) + (3.98±0.5) r^2 = 0.9998 (S12)

TABLE S14A. Experimental Retention Times of Some Simple Tertiary Amines

Run 13	479	483.9	488.8	493.8	498.9	503.8	508.8
t_o = 60 s				t/t_o			
hexanes	2.908	2.913	2.925	2.942	2.953	2.966	3.021
tributylamine	3.349	3.309	3.281	3.263	3.244	3.23	3.264
N,N-dimethyldodecylamine	4.451	4.261	4.109	3.986	3.877	3.785	3.76
N,N-dimethylhexadecylamine	9.887	8.789	7.917	7.202	6.603	6.107	5.771
alverine	22.091	18.913	16.389	14.324	12.618	11.209	10.173
trioctylamine	31.160	25.914	21.838	18.563	15.923	13.792	12.221

TABLE S14B. Evaluation of the Vaporization Enthalpy of Alverine

Run 13	- slope	intercept	ΔH_{trn}(494 K)	$\Delta_l^g H_m$(298 K)	$\Delta_l^g H_m$(298 K)
	T/K		kJ·mol^{-1}	kJ·mol^{-1} (lit)	kJ·mol^{-1}(calc)
tributylamine	4871.8	10.997	40.5	58.0±1.9	58.0±0.1
N,N-dimethyldodecylamine	6033.6	12.171	50.16	69.3±0.3	69.3±0.1
N,N-dimethylhexadecylamine	7627.9	13.993	63.41	84.8±1.0	84.9±0.2
alverine	8080.2	13.926	67.18		89.3±0.2
trioctylamine	9186.8	15.85	76.38	100.1±1.4	100.1±0.2

$\Delta_l^g H_m$(298.15 K)/kJ·mol^{-1} = (1.17±0.01)ΔH_{trn}(494 K) + (10.5±0.1) r^2 = 0.9999 (S13)

TABLE S15A. Experimental Retention Times of Some Simple Tertiary Amines

Run 14	478.9	483.9	488.8	493.8	498.8	503.8	508.7
t_o = 60 s				t/t_o			
hexanes	2.909	2.892	2.898	2.904	2.905	2.92	3.03
tributylamine	3.349	3.284	3.25	3.221	3.192	3.18	3.273
N,N-dimethyldodecylamine	4.45	4.229	4.069	3.934	3.814	3.727	3.77
N,N-dimethylhexadecylamine	9.872	8.726	7.837	7.108	6.496	6.012	5.785
alverine	22.037	18.768	16.227	14.14	12.413	11.035	10.189
trioctylamine	31.08	25.711	21.614	18.321	15.669	13.579	12.234

TABLE S15B. Evaluation of the Vaporization Enthalpy of Alverine

Run 14	- slope T/K	intercept	ΔH_{trn}(494 K) kJ·mol^{-1}	$\Delta_l^g H_m$(298 K) kJ·mol^{-1} (lit)	$\Delta_l^g H_m$(298 K) kJ·mol^{-1}(calc)
tributylamine	4908.9	11.083	40.81	58.0±1.9	58.0±0.1
N,N-dimethyldodecylamine	6062.7	12.241	50.4	69.3±0.3	69.3±0.1
N,N-dimethylhexadecylamine	7653.0	14.055	63.62	84.8±1.0	84.9±0.1
alverine	8105.5	13.988	67.39		89.3±0.1
trioctylamine	9212.8	15.914	76.59	100.1±1.4	100.1±0.1

$$\Delta_l^g H_m(298.15\ \text{K})/\text{kJ·mol}^{-1} = (1.18\pm0.01)\Delta H_{trn}(494\ \text{K}) + (10.5\pm0.1) \quad r^2 = 0.9999 \quad \text{(S14)}$$

TABLE S16. Correlations Between $\ln(t_o/t_a)_{avg}$ and liquid $\ln(p/p_o)_{exp}$ at T/K = 298.15 for Runs 5-8

run 5/run 6	-slope/K	intercept	$\ln(t_o/t_a)_{avg}$	$\ln(p/p_o)_{exp}$	$\ln(p/p_o)_{calc}$	p/Pa calc
N,N-dimethyloctyl amine	4588.7	11.254				
	4521.7	11.103	-4.099	-7.36	-7.27	71/65
tributylamine	4949.2	11.633				
	4886.1	11.491	-4.931	-8.18 [a]	-8.28	26
N,N-dimethyldodecylamine	6240.3	13.157				
	6181.1	13.023	-7.740	-11.69	-11.69	0.83
N,N-dimethyltetradecylamine	7084.6	14.185				
	7029.2	14.059	-9.547	-13.93 [a]	-13.93	0.092
N,N-dimethylhexadecylamine	7930.6	15.228				
	7880.6	15.115	-11.344		-16.17	0.01
run 7/run 8						
tributylamine	4655.4	10.504				
	4592.7	10.362	-5.08	-8.18 [a]	-8.22	27
N,N-dimethyldodecylamine	5808.0	11.679				
	5731.7	11.516	-7.75	-11.69	-11.65	0.88
N,N-dimethyltetradecylamine	6566.2	12.508				
	6522.6	12.418	-9.49	-13.92 [a]	-13.88	0.095
N,N-dimethylhexadecylamine	7350.8	13.405				
	7346.4	13.396	-11.25	-16.10 [a]	-16.15	0.01
trioctylamine	8871.4	15.189				
	8872.4	15.192	-14.57		-20.41	0.00014
tribenzylamine	8091.0	13.559				
	8097.3	13.572	-13.58		-19.15	0.00049

Run 5 &6: $\ln(p/p_o) = (1.22\pm0.022)\ln(p/p_o) - (2.27\pm0.15)$ $r^2 = 0.9993$ (S15)

Run 7 &8: $\ln(p/p_o) = (1.28\pm0.013))\ln(p/p_o) - (1.69\pm0.1.1)$ $r^2 = 0.9998$ (S16)

[a] Value based only on runs evaluated as an unknown