Enthalpy Concentration Diagram for the System Carbon Tetrachloride–Chloroform

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CARBON TETRACHLORIDE-CHLOROFORM mixtures are of theoretical interest and industrial importance. A study of published data indicated that the recent enthalpy-concentration values (*9*) required some revision since they were contrary to the reported endothermic heats of mixing and the nature of these solutions.

Isothermal vapor-liquid equilibrium data by McGlashan, Prue, and Sainsbury (*6*), coupled with the absence of temperature effect on heat of mixing of the system (*2*), have led to the conclusion that carbon tetrachloride–chloroform mixtures are regular solutions. The endothermic effects and consequent enthalpy increase are also evident from heats of mixing studies (*1, 2, 10*). The calculated values reported by Wisniak and Ossa (*9*), however, show the reverse trend.

Table I and the enthalpy-concentration diagram (Figure 1) give the revised enthalpy data at 760 mm. of Hg pressure, calculated from relevant basic data drawn from recent sources (*1, 4, 5, 7, 8*) and in accordance with the properties of regular solutions (*3*). Enthalpies were assumed as zero at datum level 0° C. for the two pure components.

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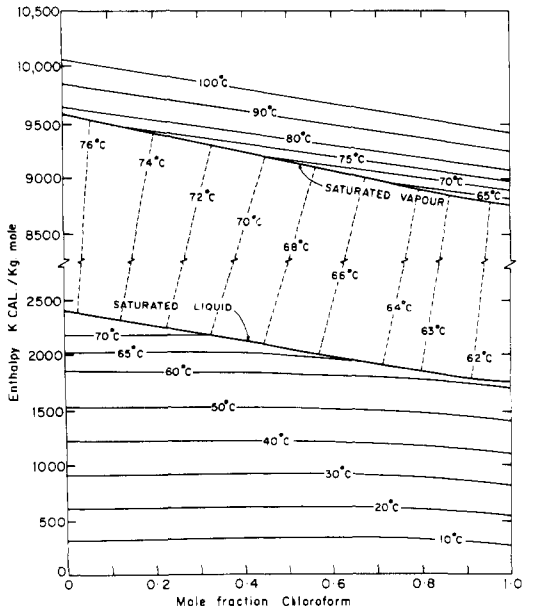

Figure 1. Carbon tetrachloride–chloroform enthalpy vs. composition diagram
Pressure: 760 mm. of Hg
Reference states: pure liquids at 0° C.

Table I. Enthalpies of System $CHCl_3$–CCl_4 (Kcal./Kg. Mole) at 760 Mm. of Hg[a]

Temp., °C.	Mole Fraction Chloroform 0.0	0.2	0.4	0.5	0.6	0.8	1.0
			LIQUID PHASE				
10	298	327	340	339	334	310	269
20	603	627	633	629	621	591	544
30	911	929	929	923	912	876	824
40	1,223	1,235	1,230	1,221	1,208	1,167	1,109
50	1,539	1,546	1,536	1,524	1,508	1,463	1,399
60	1,859	1,862	1,847	1,832	1,814	1,763	1,695
65	2,020	2,021	2,004	1,988	1,968	...	...
70	2,183	2,181	...	...	...	...	...
S.L.[b]	2,406	2,262	2,120	2,053	1,987	1,854	1,742
			VAPOR PHASE				
S.V.[c]	9,576	9,407	9,237	9,153	9,068	8,900	8,762
65	...	...	...	...	...	8,922	8,820
70	...	...	...	9,169	9,116	9,009	8,903
75	...	9,428	9,318	9,263	9,207	9,097	8,987
80	9,643	9,528	9,414	9,357	9,299	9,185	9,070
90	9,853	9,730	9,607	9,546	9,485	9,362	9,237
100	10,064	9,933	9,802	9,737	9,672	9,541	9,410

[a] Details of calculations are available from the authors.
[b] Saturated liquid. [c] Saturated vapor.

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