additive. It would be rather embarassing to have to explain a pronounced shift of the maximum deviation.

Summary.

When inert liquids are mixed it is assumed that the fluidity is a linear function of the volume composition. It had been reported that benzene and benzyl benzoate are inert as indicated by absence of contraction or heat evolution on mixing, yet at 25° their fluidity-volume concentration curve is not linear, and the cube roots of the viscosities are a linear function of the molecular concentrations.

This paper proves that benzene and benzyl benzoate show quite perceptible concentration on mixing, which is proof of aggregation which we would expect from the fluidity-volume concentration curve.

Furthermore, the cube root equation applies at only the one temperature used in the earlier work, but it does not apply at either higher or lower temperatures. This example is, therefore, not only not evidence against the fundamental hypothesis that fluidities are additive, but it is strong evidence in its favor.

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A DETERMINATION OF THE ATOMIC WEIGHT OF THULIUM.

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The material used in this work was obtained and purified as described under Thulium.[1] Owing to the fact that the fractions were very small, several of them were united. All the purest material was combined to form oxalate A, while B and C were two other sets containing small amounts of neoytterbium.

These oxalates A, B and C were converted to the hydrated chloride in a manner identical with that used for samarium. Since a detailed description of this process has already been given in a paper from this laboratory,[2] it need not be repeated here.

Dehydration of the hydrated chloride then followed, using the same method that was employed for samarium. The fused chloride dissolved quickly and completely in pure water.

The ratio, $TmCl_3 : 3Ag$, was then calculated from results obtained from the chloride analyses which were in every respect similar to those mentioned for samarium, silver and other reagents of equal purity being used.

Since each fraction contained only enough material for one analysis, Fractions A and B, after being analyzed once, were again purified as chloride for the second analysis.

[1] THIS JOURNAL, 33, 1332 (1911).

[2] *Ibid.*, 39, 2605 (1917).

The determination of the specific gravity of anhydrous thulium chloride was not undertaken. In lieu of this experimentally determined constant, the approximate density figure (3.000) was used in the atomic weight calculations. This figure was obtained by extending the curve which results from plotting density against atomic weight for those rare earths for which these constants are known.[1] Since a change in density of 0.50 causes a change in atomic weight of only 0.01, this correction is of little significance in the present work.

TABLE I.—ANALYSES.

Series $TmCl_3$:3Ag.

Ag = 107.880. Cl = 35.457.

No. of analysis.	Fraction.	$TmCl_3$ in vacuum. G.	Ag in vacuum. G.	Ag added. G.	Corrected wt. of Ag in vacuum.	Ratio $TmCl_3$. 3Ag	At. wt. of thulium.
1.....	A	2.17052	2.54519	0.00152	2.54671	0.85228	169.46
2.....	A	4.01446	4.71437	—0.00346	4.71091	0.85216	169.42
					Av.	0.85222	169.44
3.....	B	2.03868	2.39185	—0.00125	2.39060	0.85279	169.63
4.....	B	1.53851	1.80439	—0.00071	1.80368	0.85299	169.69
					Av.	0.85289	169.66
5.....	C	2.35242	2.76209	—0.00636	2.75573	0.85365	169.90

The results obtained from the purest material gave an average atomic weight of 169.44. This figure is a little higher than the usually accepted value, 168.5, which was considered by Urbain[2] to be the maximum after he had examined some fractions obtained during the separation of lutecium. The amount of ytterbium (neoytterbium) required to raise the atomic weight from 168.5 to 169.44 would be considerable. It would seem that the material used by the writers was of too high a purity for such a consideration.

Very much larger amounts of thulium oxide are being collected in this laboratory, and it is hoped that before long a much more decisive result will be obtained.

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[1] *Ann. chim. phys.*, 20, 547 (1910); *ibid.*, 21, 49 (1911); *Compt. rend.*, **140**, 1340 (1905); *Chem. News*, **91**, 280 (1905).

[2] Urbain, *Compt. rend.*, **145**, 759 (1907).