

Heats of Mixing of Alcohol Solutions. By I. Brown and W. Fock

The density values of some pure components, with densities below 1.0, given in the above three papers are low. In Table 1 of the first two papers the density (d_4^{25}) of benzene was given as 0.87359 and 0.87366 respectively; these should be 0.87366. In Table 1 of the third paper the following corrections apply:

Benzene: *For* 0.87359 *read* 0.87364.

Acetone: *For* 0.78494 *read* 0.78501.

2,2,4-Trimethylpentane: *For* 0.68766 *read* 0.68778.

These errors were brought about by the use of a table of buoyancy corrections given by Roeder (1953). His method greatly simplified the calculation of the corrections. Unfortunately, the values of the corrections given in Table 1 of his paper apply only to densities from 1.00 to 1.50 and not also to densities below 1.0 as he states.

The values given in his table were calculated from his expression $d = P'/V + K$, where d is the corrected density, P' is the difference in weights of the full and empty pycnometer, and V is the true volume of the pycnometer in ml. The correction factor K is given by

$$K = \lambda \left(1 - \frac{P'}{V} \cdot \frac{1}{\sigma} \right),$$

where λ is the air density, assumed to be the same at the two weighings, and σ is the density of the weights (8.4 for the tabulated values given).

Densities calculated by these formulae are correct to 3 in the fifth decimal place provided the air density at the two weighings does not differ by more than 0.000005.

A correct set of K values for densities less than 1.00 can be calculated from the formula. As an example, for an air density of 0.00120 the correction for a P'/V of 1.50 would be 0.00099, while that for a P'/V of 0.50 would be 0.00113 and not 0.00099 as given in Roeder's table.

To confirm the density of highly purified benzene two separate samples were prepared by the method of Brown and Ewald (1951) with an additional fractional distillation before crystallization. The freezing curve of these samples was measured in an apparatus the same as that of Herington and Handley (1950) using a calibrated platinum resistance thermometer and a calibrated Mueller bridge. The purity of the benzene was determined by the method of Mair, Glasgow, and Rossini (1941). The densities were measured by the method of Brown and Ewald (1950) and the refractive indices using a calibrated Hilger-Chance precision refractometer.

Benzene Sample	Purity Mol. (%)	$d_4^{25.00}$	$n_D^{25.00}$
A	99.98 ± 0.01	0.87374	1.49799
B	99.98	0.87370	1.49801

The accuracy of the thermodynamic data reported in the above papers is unaffected by these density errors as density values were not used for analysis but only as criteria of purity of the components.

References

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