Magnetic Properties of Benzene Vapour

FROM a theoretical point of view it may be expected that the molecular susceptibility of benzene will remain almost unaltered when the substance passes from the liquid to the vapour state. The available experimental data show, however, a distinct divergence between the susceptibility values of those two aggregate states of benzene. While the molecular susceptibility of the liquid as measured by Pascal and others is equal to 57×10^{-6} , the data obtained by Vaidyanathan¹ for the vapour state reach 83×10^{-6} . The difference between the two values, as, for example, pointed out by E. C. Stoner², is much too great to be accounted for by the adopted model of the benzene molecule.

As the values of the susceptibility of the liquid obtained by different authors agree very well with the value given by Pascal, it seemed to us necessary to repeat the measurements on benzene vapour only. A new method recently developed in this laboratory³ permitted us to make absolute measurements of the susceptibility of different gases and vapours with a sufficiently high precision. We investigated the magnetic properties of benzene vapour carefully dried and purified *in vacuo*. The value of the susceptibility of the vapour obtained by us is equal to $59 \pm 3 \times 10^{-6}$. This agrees very well with that adopted for the liquid, namely, 57×10^{-6} .

Thus it seems that the difficulty concerning the magnetic properties of benzene was mainly based on some mistake in the experimental work. Our measurements are being continued, and we hope shortly to publish elsewhere more precise data concerning this problem.

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¹ V. J. Vaidyanathan, *Phys. Rev.*, **30**, 512; 1927.

² E. C. Stoner, "Magnetism".

³ *Comptes rendus de l'Académie des Sciences de l'URSS*, in print.

Fluoride as an Impurity in Sodium Phosphate

SINCE fluoride has a strongly inhibiting effect on many enzymes, its unsuspected presence, even in small amount, may cause serious disturbance in biochemical work. It may be well, therefore, to direct the attention of biochemists to the fact that some samples of sodium phosphate contain fluoride. Recently in this laboratory it was found that a specimen of 'sodium phosphate recryst', purchased in the ordinary course as a reagent, strongly inhibited alcoholic fermentation by dried yeast. On examination it was found that fluoride was present in sufficient quantity to be easily detected qualitatively. Judging by its biochemical effect, about 0.1–0.5 per cent of fluoride (as sodium fluoride) must have been present in the sodium phosphate, but no quantitative chemical estimation was made. A single crystallisation of 25 gm. of the salt from 100 ml. of water gave a product which reacted with yeast and sugar in the normal manner.

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Kinetic Measurements with the Pulfrich-Stufenphotometer

IF a chemical reaction takes place with change of colour, colorimetric measurements at time intervals form a convenient method for examining the kinetics of the reaction. It is possible to improve the older methods¹ based on this principle by the use of the Pulfrich-Stufenphotometer by Zeiss. This instrument permits of measurements: (1) at constant temperature; (2) for a large range of concentrations; (3)

FIG. 1.

with monochromatic light; (4) in coloured and very volatile solvents.

Absorption tubes up to 4 cm. in length were kept in an air bath (Fig. 1). Those of greater length were surrounded by a water jacket (Fig. 2)². It is easy to get constant temperatures ($\pm 0.05^\circ$) in the range 0° – 80° by pumping water from a thermostat through 1–1' and 2–2' in Figs. 1 and 2.

FIG. 2.

As the thickness of the absorption tubes can be varied from 0.1 to 100 cm., the range of concentrations in which measurements can be made is very wide, and it is also possible to work with both highly coloured and weakly coloured substances.

The S-filters of the instrument permit of measurements with approximately monochromatic light of wave-lengths 470, 500, 570, 610, 720 and 750 mμ.