



On chemical action between bodies in the solid state

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It thus appears from these researches that:—

1. Any solid which dissolves in a volatile liquid diminishes the vapour-tension of this liquid.

2. In all volatile solvents the molecular diminution of the vapour-tension due to different compounds in solution approaches two mean values, which vary with the nature of the solvent, and one of which, called *the normal*, is twice that of the other: it is that which is most frequently produced.

As determined from a large number of solvents, values are given for this constant which amount to 0.0104.

Hence it may be said that even 1 molecule of a solid dissolved in 100 molecules of any volatile solvent diminish the vapour-tension of the liquid by an almost constant fraction of its value, and near to 0.0104.

The formula
$$\frac{f-f'}{fN} = 0.0104$$

may be utilized to determine the molecular weight of solid or volatile bodies. If P is the weight of a substance dissolved in 100 grammes of a volatile liquid, M' the molecular weight of the solvent, and M that of the body dissolved, we have

$$N = \frac{PM'}{M}, \text{ from which } \frac{M}{M'} = 0.0104 \times \frac{fP}{f-f'}$$

It is thus possible to calculate M when M' is known, and conversely.

This method of determining molecular weights is more difficult to carry out, and is less exact than the *cryoscopic method*, which depends on the freezing-point of solutions; but it may be of great service in many cases.—*Journal de Physique*, [2] vol. viii. p. 1.

ON CHEMICAL ACTION BETWEEN BODIES IN THE SOLID STATE.

BY W. SPRING.

The author mixed copper filings with perfectly dry pulverulent mercuric chloride, and kept the mixture in closed glass tubes which he shook from time to time. A very slow decomposition of the two bodies set in, with the formation of cuprous and mercurous chlorides. In like manner there was a decomposition of dry potassic nitrate with powdered sodic acetate freed from water of crystallization; for, after standing for four months in the drying-vessel, the mass was deliquescent in the air, from which the presence of potassic acetate may be inferred, since the original salts are not deliquescent. This reaction takes place much more rapidly at a high temperature; for although the melting-point of the two salts is above 300°, the mixture in question fused in a water-bath in three hours to a white mass, which was also seen to be deliquescent in air.—*Bull. de l'Acad. Roy. de Belge*, vol. xvi. p. 43, 1888; *Beiblätter der Physik*, vol. xiii. p. 123.