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ABSTRACTS OF CHEMICAL PAPERS PUBLISHED IN BRITISH AND FOREIGN JOURNALS.

PART II.

General and Physical Chemistry.

Influence of Halogens on the Optical Values of Double Bonds. By G. Carrara (*Gazzetta*, **23**, ii, 1—7).—The author is determining the refraction constants of a number of unsaturated aliphatic halogen derivatives, with the object of finding an explanation of the anomalous refraction of such substances as dibromacetylene and tribromethylene. In the present paper he gives the following measurements of the refractive powers of monobromethylene and iso-α-bromopropylene.

Monobromethylene.—Sp. gr. at 4°/4° = 1·56558; $\mu_{\mathrm{H}_\alpha} = 1{\cdot}44276$; $\mu_{\mathrm{D}} = 1{\cdot}44622$; $\mu_{\mathrm{H}_\beta} = 1{\cdot}45496$; $\mu_{\mathrm{H}_\gamma} = 1{\cdot}46251$;

$$\frac{\mathrm{P}(\mu_{\mathrm{H}_\alpha} - 1)}{d} = 30{\cdot}26. \qquad \frac{\mathrm{P}(\mu_{\mathrm{H}_\alpha}^2 - 1)}{d(\mu_{\mathrm{H}_\alpha}^2 + 2)} = 18{\cdot}10.$$

Iso-α-bromopropylene.—Sp. gr. at 14·6°/4° = 1·43227; $\mu_{\mathrm{H}_\alpha} = 1{\cdot}45189$; $\mu_{\mathrm{D}} = 1{\cdot}45536$; $\mu_{\mathrm{H}_\beta} = 1{\cdot}46374$; $\mu_{\mathrm{H}_\gamma} = 1{\cdot}47082$;

$$\frac{\mathrm{P}(\mu_{\mathrm{H}_\alpha} - 1)}{d} = 38{\cdot}18. \qquad \frac{\mathrm{P}(\mu_{\mathrm{H}_\alpha}^2 - 1)}{d(\mu_{\mathrm{H}_\alpha}^2 + 2)} = 22{\cdot}82.$$

The differences between the observed and theoretical values, calculating both for saturated and unsaturated compounds, are considerable, varying from 0·5 to 1·4 units.

W. J. P.

Chemical Potential of Metals. By W. D. BANCROFT (*Zeit. physikal. Chem.*, **12**, 289—297).—The author has investigated the difference of potential between the metals magnesium, zinc, cadmium, tin, lead, bismuth, mercury, and platinum in various salt solutions. He finds that when the pairs of metals are selected from magnesium, zinc, cadmium, tin, lead, and bismuth, neither the positive nor the negative ion of the salt solution has any effect on the electromotive force, which also remains constant although the dilution varies from 10 to 1000 litres. When mercury forms one pole of the combination, the influence of the negative ion of the salt solution is very marked, but concentration does not influence the electromotive force. In the case of platinum, the difference of potential depends on the concentration of the salt solution when the dissolved salt is a haloïd. This is possibly due to the tendency of platinum to form platinochlorides, &c., in which the platinum is not present as an ion.

It would appear, although the numerical agreement still leaves something to be desired, that the electromotive force of the combination $M_1 \mid RX \mid M_2$ is identical with that of the reversible combination $M_1 \mid M_1X \mid M_2X \mid M_2$. J. W.

Electromotive Forces of Polarisation. Part II. By M. LE BLANC (*Zeit. physikal. Chem.*, **12**, 333—358; compare Abstr., 1891, 1405).—From a further study of the electromotive forces of polarisation in salt solutions, the author finds that at the decomposition point in a solution from which a metal is deposited on the cathode, the electromotive force of polarisation at this electrode is equal to the electrolytic solution pressure of the metal in the solution, and is independent of the nature of the electrode, provided it is not attacked. The numerous apparent exceptions to this simple rule are referred by him to the development of gases at the electrodes, in which case the electromotive force necessary for their liberation depends in great measure on the nature and condition of the electrodes employed. By suitable arrangement of his apparatus, he was able to show that in many of these cases the solutions exhibited the normal behaviour, and that the electrolytic decomposition and formation of water (by means of a gas battery) is a reversible process. Salts of zinc, cobalt, nickel, and cadmium have a high decomposition point, and usually deposit the metal without evolution of hydrogen. This behaviour is due to special circumstances, and it is shown that under appropriate conditions hydrogen appears at the cathode, and not the metal.

The assumption that the atoms of gases contain a greater amount of energy than the molecules is considered by the author to be untenable. They form two states of matter with practically the same energy content, the difference between them being that the atoms enter into chemical action with a great velocity of reaction, which is only approached by the molecules when a catalyst is present.

J. W.

Electromotive Forces of Insoluble and Complex Salts. By K. ZENGELIS (*Zeit. physikal Chem.*, **12**, 298—313).—Ostwald obtained results for silver salts in agreement with the following general principles :—Insoluble and complex salts, on account of the small concentration of their metallic ions, show considerable deviations from the calculated value of the electromotive force of two-fluid combinations in which they occur, the deviation increasing with the decreasing solubility of the salt. Salts soluble in the complex compounds have a smaller deviation, and salts insoluble in them a greater deviation, than the complex compounds themselves. The author has tested the validity of these rules, in the case of a number of slightly soluble and complex compounds of silver, copper, lead, nickel, and cobalt, and has obtained results in harmony with them.

In the case of the phosphates of lead, cadmium, and silver, the electromotive force gradually diminishes on standing, owing probably to the formation of basic salts. Similar diminutions were observed with the carbonates, and to a smaller extent with the arsenates. Where no basic salt is formed, as in the case of silver carbonate, the electromotive force remains constant. With sulphides, an increase of the electromotive force was sometimes noticed. probably due to the transformation of the hydrosulphides at first formed into normal sulphides. J. W.

Secondary Heats of Galvanic Elements. By H. Jahn (*Ann. Phys. Chem.*, **50**, 189—192).—The author gives the following corrected numbers for secondary heats of galvanic elements.

Element.	Secondary heat.	
	Found.	Calculated.
	Cal.	Cal.
$Cu,Cu(C_2H_3O_2)_2 \parallel Pb(C_2H_3O_2)_2,Pb$	−4·151	−4·784
$Ag,AgCl \parallel ZnCl_2 + 100H_2O,Zn$	+5·139	+5·082
$Ag,AgCl \parallel ZnCl_2 + 50H_2O,Zn$	+2·620	+2·609
$Ag,AgCl \parallel ZnCl_2 + 25H_2O,Zn$	+2·654	+2 51
$Ag,AgBr \parallel ZnBr_2 + 25H_2O,Zn$	+1·488	+1·326

He also replies to some objections raised by Streintz (*Ann. Phys. Chem.*, [2], **49**, 564) as to his method. J. W.

Properties of Mixtures of Amines and Acids. By D. Konovaloff (*Ann. Phys. Chem.*, [2], **49**, 733—760).—In this paper, the author studies the electrolytic conductivity, freezing point, heat of solution, heat of dilution, and specific heat of mixtures of feeble bases, such as aniline and acids of the acetic series. An account of most of his conductivity experiments has already been published (compare Abstr., 1893, ii, 356). He formulates his conclusions as follows :—

1. Solutions formed by amines and organic acids are conductors of about the same order as solutions of organic acids in water.
2. At a high, but not infinite, dilution the conductivity of the solutions becomes infinitely small.
3. The curves which represent the electrical conductivity of these