

From an inspection of these curves it is found that: (1) The bulk volume of the mass decreases with an increase in the water content to the point A, then it increases again from A to the saturation-point B. (2) Under the condition of high molding pressure both the points A and B come to the lower water contents. (3) When the difference between two molding pressures is small, the ranges from A to B overlap at the region X-Y as shown in the figure.

In this region X-Y each body has the same water content and the same bulk volume, but the different packing of the particles. This fact could be explained from the strain-stress diagram for the bodies obtained by a torsion plastimeter. The body treated at a higher molding pressure was found to have high yield values and large maximum strain values.

10. Traube's Rule for Organic Solutions of Lower Aliphatic Alcohols. (II)

Hiroshi AIDA and Itsuro YAMAKITA

(Goto Laboratory)

The influence of lower aliphatic normal alcohols in homologous series ($C_1 \sim C_5$) on the surface tension of such organic solvent as ethylene glycol or nitrobenzene was studied by the authors and the results obtained were reported in this Bulletin Vol. 31, 134 (1953). The influence of the alcohols above mentioned, on the surface tension of another organic solvents such as aniline, dioxan or glycerin was studied by them, and the results obtained were given in this report. The relation between the surface tension depression of the solution (F) and the mole fraction of the solute in the bulk phase (C) can be expressed by the equation,

$$F = nkT \log \left(\frac{c}{\alpha} + 1 \right)$$

where k is Boltzmann's constant, T is absolute temperature, n is a surface chemical

Table 1. Values of n and α for several alcohols.

	n			α		
	A	D	G	A	D	G
Methyl alcohol	$4.89 \cdot 10^{14}$	$3.73 \cdot 10^{14}$	$5.26 \cdot 10^{14}$	$631.9 \cdot 10^{-3}$	$924.1 \cdot 10^{-3}$	$221.5 \cdot 10^{-3}$
Ethyl //	3.73 //	2.82 //	4.01 //	423.4 //	631.5 //	49.8 //
<i>n</i> -Propyl //	2.82 //	2.41 //	3.40 //	176.7 //	440.5 //	21.1 //
<i>n</i> -Butyl //	2.29 //	2.17 //	2.54 //	124.4 //	378.5 //	12.1 //
<i>n</i> -Amyl //	1.92 //	1.69 //	2.21 //	102.5 //	232.4 //	5.3 //

A, D and G denote the cases where the solvents are aniline, dioxan and glycerin respectively.

constant giving the total number of sites of adsorbed molecules in a monolayer per unit area of the solution surface when no interaction between the adsorbed molecules exists, and a is another surface chemical constant relating to the adsorption energy of the solute molecule on the solution surface. The values of n and a determined from the experimental data are given in Table 1.

11. Statistical Study on Calculation for the Calorific Value of Coal

Wataru FUNASAKA, Chikao YOKOKAWA and Tsugio KOJIMA

(Kodama Laboratory)

The accurate calorific value of coal is measured by Bomb-Calorimeter, which requires the expensive apparatus and troublesome process.

However, the calorific value of coal is much more simply calculated from the results of the proximate analysis. The present paper describes the statistical study of the degree of appropriety of the following eight formulae of calculation, those of Gmelin, Arai, Kôsaka, Nakamura, Lenoble, Goutal, Kent, and Schmit. When the coal of 3000-8000 Cal/kg. was tested, the best result in accuracy and precision was obtained by Gmelin's equation, and the Arai's followed. If the correlation is modified by using the regression line, the precision of the Arai's is improved.

12. Studies on the Sorption of Emulsifiers in the Emulsion-polymerisation

Seizo OKAMURA and Takuhiko MOTOYAMA

(Sakurada Laboratory)

In the emulsion-polymerisation of vinyl compounds, emulsifier plays roles of (1) the solubilizer of monomers into the micelle of emulsifier, (2) the locus of polymerisation and (3) the protector of the surface of polymer particles. These three roles have been already studied. For instances, the first has been pointed out by W. Harkins (*J. Am. Chem. Soc.*, **69**, 1428 (1947)) and recently discussed in some details about different monomers by present authors (delivered at the Meeting of the Division of colloid chemistry in the Chemical Society in Japan, held at Fukuoka in Oct. 1952). The second has been researched by W. V. Smith (*J. Chem. Phys.* **16**, 592, (1948); *J. Am. Chem. Soc.*, **70**, 3695 (1948); **71**, 4077 (1949)). And finally on the third point, we have assumed simply without any accurate determinations that emulsifier would be adsorbed in the surface of particles.