

CHEMISTRY

Chairman: E. L. HAENISCH, Wabash College

J. H. BILLMAN, Indiana University, was elected chairman for 1953

ABSTRACTS

The dissociation constant of dichloro-argentate ion. MARTIN ALLEN, Butler University.—A method proposed by Reynolds and Argersinger (1) for the determination of the constitution and dissociation constant of a complex ion has been applied to the dichloro-argentate ion. Equations, modifications of those derived by Reynolds and Argersinger but taking into account incomplete ionization of silver chloride, were applied to the data of Jonte and Martin (2) who studied the solubility of silver chloride in aqueous sodium chloride solutions using a radioassay technique. Results of the calculations are in good agreement with those of previous investigators: the number of chlorides coordinated to the silver is two and the dissociation constant of the complex ion is 7.5×10^{-6} .

1. REYNOLDS, C. A., and W. J. ARGERSINGER, JR. 1952. Constitution and stability of complex ions from solubility minima. *J. Phys. Chem.* **56**:417-420.
2. JONTE, J. H., and D. S. MARTIN, JR. 1952. The solubility of silver chloride and the formation of complexes in chloride solution. *J. Amer. Chem. Soc.* **74**:2052-2054.

The estimation of azeotropic composition. KEITH M. SEYMOUR, Butler University.—Early attempts at correlation of the composition of binary azeotropes with the boiling points of the components by Lecat were not useful. Correlations of azeotropic properties with the properties of the components have been published in recent years but none involving composition and component boiling points has been observed.

This paper presents a correlation which may be used for the estimation of the composition of azeotropes formed between several types of compounds. Data on a series of azeotropes between normal hydrocarbons and normal primary alcohols are reported. The composition of certain azeotropes whose properties seemed anomalous have been redetermined.

A realistic approach to the training of chemists in safety. J. S. PEAKE and C. S. ROHRER, Indiana University.—Our increasingly complex chemical industry needs mature and responsible personnel. Such competence is essential for dealing with industry's increasingly dangerous operations.

It is reasonable that professional chemists be trained from the first to be orderly, logical and safe in their planning and work. The best time for indoctrinating professional chemists is during their professional training. Habits acquired early are habits which stick. Every lecture or laboratory course offers a golden opportunity for such indoctrination. The safe way is always the best way and can be learned from the start.

The college and university chemistry departments need to awaken to their neglected responsibility to industry and to society by official adoption of programs of safety. Students at Indiana University have shown a willingness to cooperate with the safety program, if given a logical explanation and a cooperative enforcement by the faculty. Supplemental aids include suitable safety manuals, safety films and posters. Student-faculty safety committees, regular building inspections and the study of accident statistics taken within the department stimulate interest and help to eliminate hazardous practices and situations.

The chemistry departments adopting effective safety programs will gain favorable recognition from industry for producing graduates with a mature, professional attitude.

Quantitative determination of individual volatile organic acids by chromatography. R. M. BROOKER, Indiana Central College, H. A. NASH and A. R. SMASHEY, Pitman-Moore Co.—The separation of fatty acids by means of a chromatographic column of moist silicic acid and a chloroform-*n*-butyl alcohol mixture as the moving phase has been described by Marvel and Rands [J. Am. Chem. Soc., 72:2642 (1950)]. This method could be used for the quantitative determination of the individual volatile organic acids from the hydrolysis of esters if the free acids could be placed on the silicic acid column quantitatively. To accomplish this, we used the following procedure. The slightly alkaline hydrolysis mixture or slightly alkaline steam distillate containing the volatile acids was concentrated *in vacuo* and finally lyophilized. The solid sodium salts of the acids were dissolved in a small amount of water, the solution stirred with silicic acid and mixed with chloroform freshly saturated with hydrogen chloride. This was slurried onto the silicic acid column with chloroform and developed according to the procedure of Marvel and Rands.

In applying the procedure of Marvel and Rands to the separation of organic acids from the hydrolysis of alkaloids from *Veratrum Album*, it was found that the chloroform-*n*-butyl alcohol mixture failed to separate acetic acid and 2-hydroxy-2-methylbutyric acid. The use of technical *n*-butyl chloride (containing 5% *n*-butyl alcohol) gave excellent separation.

A Schematic Chart for the Qualitative Analysis of Cations. JOHN M. CHRISTENS, Indiana University (Contrib. No. 553 from the Chemistry Department).—A streamlined "flow sheet"-type chart was designed as a compromise between the separate group outlines usually found in textbooks and the complete and complicated charts available commercially. The chart follows the analysis scheme of J. H. Reedy (Elementary and Theoretical Qualitative Analysis, McGraw-Hill 1938, N. Y.). Graphic representation was emphasized as much as possible: funnels indicate separations in solutions and precipitates; solid compounds are underlined and their color given, ionic formula of cations in solution indicated. Alternate methods are kept to a minimum (only the $\text{NH}_4\text{OH}-\text{H}_2\text{S}$ method is given for group III) and unusual tests (such as for oxalates and phosphates) are referred to the textbook. The reagents added are indicated but their volumes were omitted (together with the treatment of a solid unknown) to streamline the chart.

The students were asked, in the laboratory, to keep track of their successive operations on the chart and were expected to be able to justify the use of each reagent. The chart was found useful in keeping down laboratory mistakes and in studying the analysis scheme. A minimum of descriptive information concerning each cation (properties, complex ions, flame tests, etc.) were given in a column at the right of the chart.

Blueprinted copies of the chart (18"x24") are available upon request.