From the values given above for the proportions in cubic centimeters occupied by the several elements, the atomic diameters are easily computed by the method used in the previous paper. The results are not far from those previously found, that for potassium chloride being almost exactly identical with the previous one, and are recorded in Table V. The present method, however, rests on a sounder basis and is open to fewer objections than the earlier attempt.

The application of the method to more complicated salts is less simple, but the underlying principles seem now to be clear, and to be placed upon a firm foundation. These principles are simply those indicated by the theory of atomic compressibility as outlined during the last 23 years and summarized in the Faraday Lecture of 1911 and the Presidential Address of the American Chemical Society in 1914. The present results enforce those conclusions without change in the ideas involved.

Many aspects of the behavior of solids and liquids seems to be clarified by these considerations. Some of them will receive further discussion in the near future.

Summary

The object of this paper is to evaluate the respective bulks of the elements in combination from the study of the compressibilities of the individual elements, and the contraction which occurs during combination. With the help of Bridgman's accurately determined pressure-volume curves for sodium and potassium, and my own earlier study of the compressibilities of bromine and chlorine, extrapolated by careful study of the nature of the curves (for which surprisingly concordant equations of the type $(p + P)(v-B)=K$ are derived), the values of the average internal pressures existing in these salts, as well as the relative volumes of the components and the atomic diameters in combination were computed. Many conclusions are drawn from the outcome, and it is pointed out that the methods employed have wide applications and may lead to interesting results in these as well as in many other directions.

CAMBRIDGE 38, MASSACHUSETTS

NOTES

A Lecture Experiment Demonstrating Adsorption.—A quantity of a solution of malachite green oxalate is poured into a clean glass beaker of about 1 liter capacity, and immediately poured out. The beaker is then washed with a copious supply of cold water until the dye apparently has been completely washed away. The beaker is finally rinsed with 5 to 10 cc. of water which is transferred to a test-tube. Not a trace of color can be observed in the water

That an adsorbed film of dye does exist on the glass surface is shown by rinsing the beaker with 5 to 10 cc. of glacial acetic acid. The acid is transferred to another test-tube for comparison with the first. By holding a sheet of white paper back of the 2 test-tubes the difference in color is made sufficiently pronounced to be seen by a large audience. To preclude the possibility that the color of the second rinsing is merely accentuated by the presence of acetic acid, some of the acid may be added to the water in the first test-tube.

The experiment illustrates not only the fact of adsorption itself, but the effect of the solvent upon the equilibrium, and the rapidity with which adsorption takes place.

CONTRIBUTION FROM THE DEPARTMENT OF CHEMISTRY
UNIVERSITY OF OREGON
EUGENE, OREGON
H. G. TANNER

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Qualitative Analysis of the Iron Group.—The writer has found it feasible to modify the generally accepted analysis of the iron group and finds that the resultant method both shortens the procedure and increases the accuracy of the work of his students.

The following table of results shows that, with proportions rarely met, all separations are quite sharp. The numbers represent milligrams of the ion named.

Zn	Cr	Mn	Fe	Co	Ni
...	..	9	9	1.8	9
...	..	3.6	3.6	3.6	18
...	..	1.3	13.3	0.67	13.3
...	..	2	100	1	100
5	..	..	250	..	..
5	..	250	..	..	..
5	..	250	250	..	..
5	..	500	500	..	..
5	..	500	500	2	3
5	8.5	500	500	2	3
0.5	..	1	..	0.5	5
0.5	..	5	..	5	5
0.5	17	18	20	10	5
2	..	500	500	1	10

The method of W. A. Noyes[1] is used for the separation of aluminum, chromium and zinc, but his method for separating these metals from those of the iron division is modified by the use of a large excess of sodium hydroxide. As the table shows, this gives a sharp enough separation of the zinc to make it unnecessary to search for it in the iron division No difficulty has been met because of the solution of the iron division with the aluminum division.

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[1] Noyes, "Qualitative Analysis," Henry Holt and Co., **1911.**

The iron division precipitate is treated directly with nitric acid and potassium chlorate to remove the manganese. (At this point phosphates may be removed if present.) Iron is removed by adding a large excess of ammonium hydroxide. The filtrate from the iron precipitate is evaporated until only a faint odor of ammonia remains and nickel is tested for by adding dimethyl glyoxime directly to $^1/_5$ of this solution, no adjustment of hydrogen ion being necessary.

The remainder of the solution is further evaporated to a sirup and transferred to a test-tube; enough water is then added to dissolve the precipitated salts, and cobalt is tested for by a modified Vogel's test; 3 cc. of 10% potassium thiocyanate solution is added, followed by 3 cc. of a mixture of amyl alcohol and ether (1 vol. : 3 vol.) and the tube gently shaken. Cobalt causes the ether layer to become blue-green. If the color is not distinct, the careful addition of a few drops of 12 *N* hydrochloric acid to the ether layer will give the blue-green color if cobalt is present, or a straw-colored or colorless layer, if it is absent. This test is extremely sensitive and can be applied to the original solution if iron is absent.

The writer wishes to thank Professor J. H. Reedy of the University of Illinois and Professor J. F. G. Hicks of the University of Nevada for testing the above method with their students.

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RALPH W. HUFFERD

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EFFECTS OF THE METHOD OF DESICCATION ON THE CARBOHYDRATES OF PLANT TISSUE[1]

BY KARL PAUL LINK AND W. E. TOTTINGHAM

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Introduction

In determining the composition of plant tissue it is essential that the material undergo a minimum of possible chemical changes from the time the plant is harvested to the time actual analysis is begun. When a large number of samples are involved simultaneously, various mechanical difficulties encountered in extraction render it almost impossible to analyse the fresh tissue directly. Therefore, it is practically necessary to resort to some method of preserving the sample for subsequent analysis.

Two methods have been used to preserve such tissues, namely: (1) desiccation by heating at 85° to 105°, and (2) immersion in conc. alcohol.

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[1] Published with the permission of the Director of the Wisconsin Agricultural Experiment Station.