Summary

Ferric chloride reagent is compared with cupric potassium chloride as a gravimetric reagent for sulfur. The advantages of ferric chloride are noted in the case of bronze and metallic copper. Possible use in the determination of the composition of non-ferrous furnace metals is mentioned.

X-ray diffraction patterns of the ferric chloride and the cupric potassium chloride residues show that sulfur remains as cuprous sulfide and elementary sulfur.

The procedure described has been in use for approximately one year and has given satisfactory results.

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On the Toxicity of the "Arochlors"

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A recently published article (*1*) has recommended the substitution of one of the "Arochlors" as the melting-point bath liquid in preference to the customary sulfuric acid. As stated in that article, the "Arochlors" are a group of chlorinated diphenyls produced by the Monsanto Chemical Company.

There is need, therefore, to give a warning. For the toxicity of these compounds has been repeatedly demonstrated, both from the standpoint of their absorption from the inspired air as well as from their effect in producing a serious and disfiguring dermatitis when allowed to remain in contact with the skin. Since these effects have been repeatedly observed, industrial hygienists have taken great pains to see that proper controls have been established wherever these products are used. For example, the maximum allowable concentration of chlorinated diphenyl for an 8-hour working day is 1 milligram per cubic meter of air.

It is probable that nothing like an uncontrolled industrial exposure will occur in the laboratory. However, whether an individual is subjected to a possible acute exposure to chlorinated diphenyl and its serious consequences will depend upon the size of the melting-point bath, the caution with which it is used and the temperature to which it may be heated. Likewise, with

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careless handling of the material and the resulting contamination of the skin, clothing, laboratory towels, work table surfaces, etc., the way if left open for the producing of dermatitis. Scrupulous cleanliness must be insisted upon wherever this material is handled.

The foregoing remarks have been prompted by the belief that, in recommending the use of a material with which is associated a potential hazard from the health standpoint, it is very important that the possible consequence be presented together with recommendations for correct handling.

LITERATURE CITED

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Short Cut in Routine Water Analysis

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The usual procedure in making routine water analyses, particularly of boiler salines, is to titrate a sample with sulfuric acid to the phenolphthalein end point. The titration is then continued to the methyl orange end point. These measurements of the phenolphthalein and methyl orange alkalinities are generally expressed in grains of $CaCO_3$ per gallon.

To measure the salinity, a fresh sample of the water is first titrated with sulfuric acid to the phenolphthalein end point. Then a few drops of a 5% solution of potassium chromate are added and the sample is titrated with silver nitrate. The salinity is expressed as grains of NaCl per gallon.

When a large number of samples are to be analyzed, it would save time if all three determinations could be run on the same sample. Since the chromate acts as an indicator only through a narrow *p*H range, some means must be used to increase the *p*H of the sample which has been acidified to the methyl orange end point. To accomplish this, the potassium chromate is dissolved in a 0.1 *N* sodium bicarbonate solution instead of the usual distilled water. Five drops of this indicator solution are sufficient to bring the *p*H of the sample within the desired range.

Duplicate tests were run with the buffered and unbuffered indicator. The results, expressed in grains per gallon, were as follows:

Sample	Methyl Orange Alkalinity $CaCO_3$	Salinity NaCl Unbuffered	Salinity NaCl Buffered
Neutral 0.390 *N* NaCl	0.0	1336	1336
Boiler saline	23.1	267	267
Tap water	55.0	72	72

Thus it will be seen that the short cut is fully as accurate as the standard method of analysis.

PCB-ARCH-EXT0381061

slowly in an oven at low heat or by passing a small electric current through it for some hours. The exposed plaster is then painted. When dry, it is covered with water glass. The outside of the funnel may be protected as desired.

This heater can be set up in a 5" ring. It will accommodate a 4" glass funnel snugly, with only rim and tip protruding. The temperature requirement for any given filtration is ascertained easily and accurately. A filter paper is folded, inserted in the funnel and moistened with a cool portion of the solvent to be used in the filtration. The funnel is then covered with a clean, cool watch glass and the current is switched on. When condensate begins to appear on the watch glass, the funnel is ready for use and the current is turned off. It is unnecessary to control the temperature thermostatically or by means of the usual current controls. The appearance of the condensate is a satisfactory temperature indicator.

It is safe to use this technique with most hot organic liquids, because the heating element is not exposed and the inside surface of the heater cannot reach a temperature high enough to ignite inflammable vapors from the liquids that are commonly used. Further, it is very convenient to use such a heater. For the stem provides a heated zone between the receiving vessel and the tip of the filter cone. The possibility of crystallization in the residue on the filter paper is minimized, for the paper is not exposed to the cooler air. The splashing of drops may thus be eliminated, since the tip of the funnel can touch the side of the receiver. Standard funnels may be used and do not have to be shortened. If some crystallization should occur at the very tip of the stem, it is concentrated in a small area and may be removed with a stirring rod, or the funnel may be raised momentarily into the heater to effect re-solution of the crystals. Besides, this apparatus is designed to heat up rapidly, attaining an operating temperature of 100° C. in less than five minutes. It has good heat capacity and keeps the temperature near the boiling point of the solvent sufficiently long for most filtrations. Materials for its construction are generally available. It is simple to construct and operate.

The author is grateful to Arthur T. Martin who helped in the design and has constructed many heaters of this type for use in this laboratory.

A Safe Liquid for Melting-Point Baths

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In most laboratories it is customary to employ a bath of concentrated sulfuric acid in making melting-point determinations. The use of this acid is objectionable on account of the inherent danger. Of late some laboratories have adopted one of the "Arochlors"* as a bath liquid. That these liquids possess definite advantages over sulfuric acid is generally conceded.

We have found that "HB-40,"* consisting mainly of a mixture of terphenyls, is a very satisfactory liquid for melting-point baths, particularly where temperatures exceeding 300° C. are not desired. We heartily recommend its adoption.

* Marketed by the Monsanto Chemical Company, 30 Rockefeller Plaza, New York City.

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