NOTES

Note on the Formation of Ammonia from Active Nitrogen and Active Hydrogen.—Professor A. Koenig and E. Elöd have called my attention to experiments in which they mixed hydrogen and nitrogen, after each gas had been activated separately in a discharge.[1] They did not find ammonia, contrary to results obtained by me.[2] This apparent discrepancy can be explained easily by the conditions of their experiments. One explanation is suggested by Koenig and Elöd themselves, namely, that at the much higher pressures employed by them (10–15 mm. compared to 0.04–0.1 mm. in my experiments) the atomic hydrogen had recombined before reaching the mixing point. This explanation is supported by recent work.[3] Another effect contributing to the discrepancy is that ammonia is decomposed by active hydrogen.[4] At the high pressures of active nitrogen and due to the comparatively long gas exit tube, all of the ammonia (if a trace did form) must have been destroyed. In my experiments more favorable conditions obtained, the condensable gases being frozen out at liquid air temperature immediately following and in close proximity to the mixing chamber. Even so, the ammonia yields were undoubtedly somewhat reduced in the passage of this short space.

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A Modified Confirmatory Test for Aluminum.—The confirmatory test for aluminum given by Noyes[1] is not quite satisfactory for class exercise, for the test requires much practice and great dexterity on the part of the students. For this reason, Otto[2] sought to improve this cobalt aluminate test.

Noyes' procedure[1] is as follows. The ammonium hydroxide precipitate is dissolved in nitric acid and to the solution a few cc. of water and drops of cobalt nitrate solution are added, in addition to the ammonium hydroxide solution to reprecipitate the aluminum. The precipitate is washed free from sodium salt as completely as possible. The filter paper is then rolled with the precipitate, a platinum wire wound around it and the

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[1] A. Koenig and E. Elöd, *Z. Elektrochem.*, **21**, 285 (1915).

[2] Lewis, This Journal, **50**, 27 (1928).

[3] J. Kaplan, *Phys. Rev.*, **30**, 640 (1927).

[4] Strutt, *Proc. Roy. Soc. London*, **85**, 219 (1911); Willey and Rideal, *J. Chem. Soc.*, **1927**, 677.

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[1] A. A. Noyes, "Quantitative Chemical Analysis," The Macmillan Company, New York, **1923**, p. 190.

[2] C. Otto, This Journal, **48**, 1604–1605 (1926).

filter heated until the carbon is burned off. A blue residue shows the presence of aluminum.

The modification introduced in the test by the authors is that the precipitate produced in the reprecipitation is filtered through a filter paper with a few asbestos fibers at the cone of the filter. Instead of the filter paper, the asbestos fibers which hold the precipitate are burned, hooked in a platinum wire. Blue beads over the asbestos indicate the presence of aluminum.

In this proposed modification, several advantages are obtained. The presence of 0.2 mg. of aluminum is easily detected. The presence of sodium salt with the precipitate does not interfere in the test; thus, complete removal of sodium salt by washing is not necessary. Washing is necessary when a filter is used, for sodium salt will fuse with the filter and lessen the delicacy of the test. The modified test is satisfactory even when the aluminum precipitate is not washed at all. The ignition to produce the blue cobalt aluminate takes a shorter time. A longer ignition does not interfere with the result, as in the case of filter paper, which drops to pieces if ignited too long.

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6-ALDEHYDO-COUMARIN AND DYES DERIVED FROM IT

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Richard Stoermer and Ed. Oetker[1] first obtained 6-aldehydo-coumarin (melting at 189°) as an intermediate product in the synthesis of coumarin-6-carboxylic acid from 6-acetoxymethylcoumarin, but it was never prepared in quantity and no work appears to have been done with it. In the present case *p*-coumaric aldehyde or 6-aldehydo-coumarin has been prepared in quantity by the application of Reimer and Tiemann's reaction on coumarin (the yield being about 3.5 g. of the aldehyde from 16 g. of coumarin).

The application of Reimer and Tiemann's reaction on coumarin may be expected to lead to the formation of two aldehydes, the aldehyde group occupying the ortho position in one (I) and para position in the other (II) with reference to the lactonic oxygen atom; but it has been possible to isolate only one aldehyde in the pure condition, which is found to be identical with 6-aldehydo-coumarin, melting at 187–189°.

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[1] Stoermer and Oetker, *Ber.*, **37**, 192–203 (1904).