The total amount of lead dispersed per minute by 500 v., using a capacity of 0.034 microfarad and a current of 1 amp., is 0.012 g.

Summary

1. It is shown that the precipitation of lead hydrosols is due to the oxygen and carbon dioxide of the air.

2. An apparatus is described by means of which the colloidal solution can be prepared under an indifferent atmosphere and can be rendered more stable.

3. Thus far we have not been able to maintain a stable solution of a higher concentration than 0.2%.

CLEVELAND, OHIO

NOTE

Aluminum Amalgam as an Agent for the Reduction of Phenylsulfone Chlorides to Thiophenols.—Aluminum amalgam in alcohol-ether solution has long been known to be a neutral and, therefore, desirable reducing agent in many cases.[1] Nevertheless, it has not been used in general for the reduction of aromatic sulfone chlorides to thiophenols, as it has been found that the amalgams sometimes split off the sulfonic group, replacing it with hydrogen. Thus, sulfocinnamic acid is reduced upon treatment with aluminum amalgam to cinnamic acid or even further.[2]

α-Naphthol-2,4-disulfonic acid is known to be reduced with sodium amalgam to α-naphthol-2-sulfonic acid. However, in the tested cases where an aromatic sulfone chloride was reduced in alcohol-ether solution, this tendency to split off the sulfonic group was not found to be great, especially when the reaction was not allowed to become too violent.

With reactions which are, at least to a certain extent, analogous to that with aluminum amalgam reported here, metallic calcium only has been used previously for the reduction of aromatic sulfone chlorides to the corresponding thiophenols in acid-ether-alcohol solution.[3]

The advantages of the reduction with aluminum amalgam apply particularly well to the intended reactions; thus, it is possible to regulate the intensity of the hydrogen evolution by the gradual addition of water, and the separation of the formed mercaptans, especially in the case of amphoteric substances, is facilitated. In addition, by this method, the careful control of the temperature[4] which is sometimes necessary is not essential, as the intensity of the reduction can be regulated, as already mentioned.

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[1] (a) Wislicenus, *J. prakt. Chem.*, **54**, 18 (1896). (b) Cohen and Ormandy, *J. Chem. Soc.*, **57**, 811 (1890).

[2] Moore, *Ber.*, **33**, 2014 (1900).

[3] Beckmann, *Ber.*, **38**, 904 (1905).

[4] Zincke, *Ber.*, **51**, 755 (1918).

The usual procedure is to dissolve the sulfone chloride in a mixture of alcohol and ether, and to add 150% of its weight of aluminum amalgam (for preparation of the amalgam, see Ref. 1a). The mixture is refluxed for about an hour, the necessary amount of water being added gradually. If the expected thiophenol is volatile, separation with steam is advantageous. The first alcoholic distillate is kept separate, as small amounts of the ethyl ester of the thiophenol are sometimes formed. Amphoteric thiophenols are isolated after filtration from the unchanged amalgam and aluminum hydroxide by evaporation of the solution.

Thus, 1,4-dichloro-2-phenylsulfone chloride, napthalene-β-sulfone chloride and acetanilide-*p*-sulfone chloride were reduced to the corresponding thiophenols. The yields varied from 50 to 70% of the theoretical amount.

CONTRIBUTION FROM THE
CHEMICAL LABORATORY,
PRINCETON UNIVERSITY,
PRINCETON, NEW JERSEY
E. GEBAUER-FÜLNEGG[5]

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NEW BOOKS

Gmelins Handbuch der anorganischen Chemie. (**Gmelin's Handbook of Inorganic Chemistry.**) Edited by R. J. MEYER. Eighth edition, revised. **Bismuth.** Serial No. 19. Published by the Deutsche Chemische Gesellschaft, Verlag Chemie, G. m. b. H., Corneliusstr. 3, Berlin W 10, Germany, 1927. xxii + 229 pp. 11 figs. 18 × 26 cm. Price M. 33.

This excellent volume is the sixth instalment of the new edition of "Gmelin" being issued by the German Chemical Society. It covers the history, occurrence, metallurgy and properties of bismuth and of its compounds with those elements (Nos. 1–18) preceding it in the serial list adopted for this handbook. The chapter on the occurrence of bismuth is particularly complete, occupying some twelve pages. The far greater interest of bismuth to the physicist than to the chemist is shown by the relative lengths of the sections devoted to its physical and to its chemical properties. The former occupies sixty-four, the latter six pages. The compounds of bismuth with fluorine have been omitted in the table of contents.

The Editor's collaborators on this part of the volume were Ellen Schön, Rudolf Sahmen and Gertrud Wilcke.

There is a final chapter of twenty-six pages devoted to the radio-active isotopes of bismuth, namely, Radium C and E, Thorium C and Actinium C. Otto Erbacher was the collaborator on this chapter.

The literature has been covered in this volume up to July, 1926.

ARTHUR B. LAMB

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[5] International Research Fellow.