

ferred to the copy. In such case the power of resistance of the copy is very low.

The writing after press copying was exposed to sunlight along with the writing from which no press copy had been taken. In nearly all cases the former faded much more readily, and in some cases the difference was exceedingly marked, the greatest difference being found in the lighter inks.

The inks examined represent the products of nearly all the large manufacturers in this country and show a very wide range in composition. Many of these are unsuited for record purposes while several are entirely satisfactory as record inks.

The United States Treasury Department requires that the ink furnished that department shall equal in quality an ink made up with 23.4 grams tannic acid, 7.7 grams gallic acid, 30 grams ferrous sulphate, 10 grams gum arabic, 25 cc. dilute hydrochloric acid and 1 gram carbolic acid, the whole being made up in volume to 1000 cc. A number of the inks examined were apparently made up to meet the above requirement. Such an ink would have a specific gravity of about 1.0360 and contain about 0.60 per cent. of iron, and would meet all ordinary requirement of a record ink. In fact, a few inks that were somewhat lighter than the above were found entirely satisfactory for record purposes. It is well, however, to have the requirements of such an ink amply high so long as its working qualities are not interfered with.

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NITROSYL SELENIC ACID.

By VICTOR LENHER AND J. H. MATHEWS.

Received January 27, 1906.

NITROGEN tetroxide, when brought in contact with sulphuric acid, yields the well-known nitrosyl sulphuric acid. When selenic acid is substituted for the sulphuric acid, a product is obtained analogous to nitrosyl sulphuric acid. However, in the case of the preparation of nitrosyl selenic acid, it is necessary that a low temperature should be used.

When selenic acid having a strength of 83 per cent. is mixed with an excess of liquid nitrogen tetroxide and the solution cooled with solid carbon dioxide, a light blue solid forms on the surface, and immediately below this a layer of a darker blue solid. These two layers form over a heavy syrupy liquid, consisting

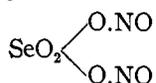
mainly of selenic acid. The light blue superficial layer, when submitted to analysis, shows a high content of nitrogen, but repeated analyses have shown this substance to be a mixture of varying amounts of the excess of nitrogen tetroxide with the material composing the darker blue layer. The two layers are defined so sharply that the dark blue material can be easily obtained in pure condition.

This blue solid can also be formed by using a more concentrated selenic acid, adding the nitrogen tetroxide and introducing a small quantity of water; considerable variation in the strength of the acid does not materially affect the formation of the two layers of light and darker blue solid, nor their composition.

The dark blue solid forms and melts at -13° . It fumes strongly in the air with the liberation of the oxide of nitrogen and selenic acid remains.

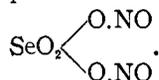
Analysis: 0.1120 gram substance gave 0.0333 gram nitric oxide equivalent to 29.7 per cent., and 0.1131 gram of substance gave 0.03417 gram nitric oxide corresponding to 30.2 per cent.

If both of the hydroxyl groups in selenic acid be replaced by the $-O.NO$ group we have

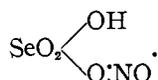


This compound requires 29.55 per cent. of nitric oxide. The analytical results obtained from the material composing the blue layer accord with this theoretical amount.

It thus appears that when nitrogen tetroxide acts upon fairly strong selenic acid at low temperatures it is possible to replace both of the hydroxyl groups and obtain the body



Although many products were examined, we have not been able to prepare the true nitrosyl selenic acid having the composition



The compound described is of constant composition. It is decomposed by water in a manner analogous to nitrosyl sulphuric acid. It is not stable above -13° , losing the oxide of nitrogen

and reverting to selenic acid. All of the methods which are described in the literature for the preparation of nitrosyl sulphuric acid have been tried with selenic acid but all others than the method described have proven fruitless in our hands.

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MONOHALOGEN DERIVATIVES OF TRIPHENYLCARBINOL CHLORIDE.

BY L. H. CONE AND C. P. LONG.

Received February 10, 1906.

IT WAS shown by Gomberg¹ that the monohalogen derivatives of triphenylcarbinol chloride can be prepared from benzophenone dichloride and the corresponding phenyl halide by the Friedel and Crafts reaction. The position of the halogen was assumed to be the para. This was proven in the case of the monochlor compound by preparing it from the dichloride of *p*-chlorobenzophenone and benzene. We now undertook to condense in a similar way the dichloride from *p*-bromobenzophenone with benzene in order to determine the position of the bromine in the monobrom compound. Very unexpected results were obtained. They were found to be due to an abnormal reaction of phosphorus pentachloride with the *p*-bromobenzophenone. Recourse was had to Grignard's reaction, using both the methyl ester of *p*-bromobenzoic acid and *p*-bromobenzophenone as starting materials. The monobromotriphenylcarbinol chlorides from both of these materials were identical, and were, of necessity, the para-compound. The comparison of the carbinol chloride from the benzophenone dichloride and bromobenzene by the Friedel and Crafts reaction with that obtained by Grignard's reaction showed the former to be also the *p*-compound.

1. *Preparation of p-Bromotriphenylcarbinol Chloride by the Friedel and Crafts Reaction, (p-BrC₆H₄(C₆H₅)₂CCl).*¹—A mixture of an excess of bromobenzene (2-3 mol.) and benzophenone dichloride (1 mol.) was treated with a small quantity of aluminum chloride and heated until the reaction started. It was usually necessary to heat the mixture to about 115°. After the reaction was well started, the temperature was allowed to drop to 80°. The reaction was maintained smoothly at this temperature for several hours by frequent additions of aluminum chloride. The reaction

¹ Ber. 37, 1633.