

XXI.—On *Picric Ether*.

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PROFESSOR MITSCHERLICH* believed that he had produced this compound by digesting for some hours a solution of picric acid in absolute alcohol mixed with a little sulphuric acid. This experiment has been repeated by Erdmann and several other chemists, but without success, a quantity of resinified picric acid being the only product. This result agrees with the description that Mitscherlich gives of his product, but which he did not analyse.

Picric ether may, however, be readily produced by acting on picrate of silver with iodide of ethyl.

One of the most convenient ways of preparing picrate of silver is to add an excess of carbonate of silver to a hot solution of picric acid, and after boiling for a few minutes, filter the solution and leave it to cool, when the picrate crystallises out in beautiful shining yellow needles, united in radiated groups.

One part of this salt in a perfectly dry state is placed in a flask furnished with a long condensing tube, and five parts by weight of iodide of ethyl are then poured on it. By using this large excess of iodide of ethyl, viz., ten times the theoretical quantity, the liquid does not become very hot, thus avoiding the loss of iodide of ethyl which takes place if equal weights are used, the action then being very violent. After allowing it to stand for a short time, it is digested in a water-bath for five or ten minutes to complete the decomposition, and the digesting tube being then replaced by a short bent one, the excess of iodide of ethyl is distilled off.

To the residue in the flask, consisting of iodide of silver and picrate of ethyl, 8 parts of spirit are added, and the whole is boiled for a few minutes and filtered; on cooling, the solution deposits the picric ether in long needles. By again treating the residue with spirit, a further amount of the ether may be extracted. The entire product is recrystallised once or twice from spirit and well washed with distilled water, in order to separate the small quantity of picric acid which adheres to it.

If an alcoholic solution of iodide of ethyl be used instead of the pure iodide in the preparation of picrate of ethyl, a large proportion of picric acid is set free, and at the same time some ethylic

* Lehrbuch. der Chemie i, 222.

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ether is formed. In order to obtain the picric ether from this mixture, the solution is filtered from the iodide of silver, and, after evaporation, boiled with water, into which enough carbonate of calcium is gradually introduced to saturate the free picric acid. The picric ether separates in the form of a heavy oil, which congeals on cooling, and may be purified in the way already described. The first process already given is, however, by far the best.

Picric ether, when purified in the way described, consists of nearly colourless needles, having only a slight yellow tinge, which, when slowly deposited from spirituous solutions, are readily obtained one or two inches in length. When exposed to light they gradually become coloured. It is slightly soluble in boiling water, from which it crystallises out entirely on cooling. It is likewise soluble in iodide of ethyl, ether, bisulphide of carbon, and benzol. It melts at $78^{\circ}\cdot5$ C., and congeals at 73° C. When heated on platinum foil, it burns with a smoky flame. But when heated in a tube, it melts, and, on increasing the heat, is decomposed, with slight deflagration and deposition of carbon.

The substance dried in vacuo was analysed with the following results:—

I. $\cdot410$ grm. gave $\cdot561$ grm. carbonic acid, and $\cdot120$ grm. water.
 II. $\cdot535$ „ „ $\cdot733$ „ „ $\cdot133$ „ „

	Theory.	I.	II.	Mean.
C ₈	37·36	37·33	37·37	37·35
H ₇	2·72	2·76	3·18	2·97
N ₃	16·34	—	—	—
O ₇	43·58	—	—	—

These numbers, as may be observed, agree very closely with the formula $C_6N_3O_7H_2C_2H_5$.