

XXXVII.—*A Simple Method of Preparing Potassium Stannichloride.*

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THE methods used to prepare potassium stannichloride, K_2SnCl_6 , usually involve the employment of excess of potassium chloride in order to diminish the hydrolysis of the stannic chloride. Analyses of the products obtained from mixed solutions of the two chlorides frequently indicate too high a percentage of potassium.

It is now found that a highly satisfactory product may be readily obtained by the oxidation of potassium stannochloride by means of chlorine. The potassium stannochloride need not be isolated; a solution of stannous chloride in a concentrated solution of potassium chloride made slightly acid with hydrochloric acid may be used instead. The reaction proceeds quite well when a concentrated solution of the salts in the molecular proportion of 2 parts of potassium chloride to 1 part of stannous chloride is used. It was found unnecessary, if not inadvisable, to employ an excess of potassium chloride. With weak solutions hydrolysis takes place; thus it is necessary to use concentrated solutions of the salts.

The method employed was as follows. A concentrated solution of 16 grams of potassium chloride was prepared and 22 grams of stannous chloride were dissolved in it by warming, with the addition of a few drops of concentrated hydrochloric acid. A slow stream of chlorine was passed in for about three hours, after which the oxidation was complete. The solution, after saturation with the gas, was treated with a little concentrated hydrochloric acid and slowly evaporated on a water-bath at $50-70^\circ$ for about two hours. Small, octahedral crystals of potassium stannichloride separated out on remaining overnight. These were collected, dried on a porous plate, and analysed without recrystallisation. (Found, $K=19.25$; $Sn=28.69$; $Cl=51.99$. Calc., $K=19.19$; $Sn=28.72$; $Cl=52.02$ per cent.)

Experiments were carried out in which potassium stannochloride was first isolated before the chlorination. The stannous double salt was prepared by adding the calculated amount of stannous chloride to a saturated solution of potassium chloride containing a little hydrochloric acid. The solution was concentrated somewhat on a water-bath at a temperature not exceeding 60° ; it was then filtered, and allowed to crystallise. The crystals were dried on a porous plate. (Found, $K=20.72$; $Sn=31.58$; $Cl=37.89$; $H_2O=9.60$. $K_2SnCl_4 \cdot 2H_2O$ requires $K=20.80$; $Sn=31.74$; $Cl=37.86$; $H_2O=9.60$ per cent.)

When this salt was dissolved in water slightly acidified with hydrochloric acid and treated with chlorine, it passed quantitatively into potassium stannichloride, and as there is nothing in solution except the stannichloride, this seems to be the best method of obtaining the salt. That the oxidation was quantitative was proved by expelling the excess of free chlorine and adding mercuric chloride to the solution, when no precipitate was obtained.

Potassium stannichloride gave reactions associated with stannic compounds, whilst potassium stannochloride was found to show those of stannous salts.

With the view of seeing whether the method above described for the preparation of potassium stannichloride was of general application, preliminary experiments were carried out with manganous chloride and lead chloride in place of stannous chloride. No double salts of the alkali chloride with either of the dichlorides were obtained. Mixed solutions of the two chlorides were submitted to the action of chlorine, but it was not found possible to isolate potassium manganichloride or plumbichloride by this method. The crops of crystals obtained in various experiments were found, on analysis, to be mixtures.

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