

THE HYDROXY—HYDROXIDE PRECIPITATION OF TIN FROM GELATIN.

The only evidence we have of the presence of tin in gelatin lies in the name itself. The first part of the name probably comes from the Greek word *gelan* which means "to laugh". The latter part, which is tin itself leads us to conclude that gelatin is tin which makes us laugh which is in certain aspects an appropriate name. With this conclusive evidence of its presence in gelatin it remains to derive a procedure for its precipitation by the hydroxy-hydroxide method.

Since tin is a compound composed of the elements nitrogen and sulphur, which is readily seen from the formula $S-n$, it is evident that we must obtain the nitrogen and sulphur which are present in the gelatin in forms, such that they will readily combine. In the process of hydrolysis of gelatin we find that amino-acids are formed, of which the amino-acetic is formed in the largest amounts. The amino-acetic acid on treatment with nitrous acid gives the reaction characteristic of all primary amines, which in this case liberates nitrogen with the formation of methyl alcohol. The free nitrogen is then heated in a vacuum with the element argon resulting in the formation of the solid nitrogen argide which has the formula Na , better known as sodium. The sodium is very active and with the addition of water, sodium hydroxide is formed.

Turning to the methyl alcohol we first convert it into ethane by the Grignard reaction and then burn it to elementary carbon. The elementary carbon so formed is very inactive and it is first dissolved in water. The solution of carbon is slowly brought to a point of supersaturation before the carbon is reprecipitated. The precipitation is brought about by the addition of several diamonds which are thrown into the solution. This is in compliance with the fact that solids separate out very rapidly from a supersaturated solution if at least one crystal is present. The carbon in this form is exceedingly active and combines readily with the sulphur, which is present in the gelatin, with the formation of Cs at a temperature of about $-272.9^{\circ} C$. The Cs is then brought in contact with pure Ca with the result that the carbon precipitates. This precipitation is brought about by the Wurtz reaction on the passing of an electric current between two carbon electrodes. With the deposition of the carbon we have in the solution a substance with the formula As or arsenic. The arsenic is treated with the alpha hydroxy-hydroxide of platinum and a compound of the formula $H-O-H-O-As$ is formed. This compound assumes the valence of hydrogen as two but at the present time very few doubt its existence.

This hydroxide of arsenic is brought together with the sodium hydroxide and $AsNa$ results with the loss of water and oxygen. When this is heated in a bomb at a temperature of about $1000^{\circ} C$. with very dilute denatured alcohol the molecule of argon A_2 , is dissolved out with precipitation of Sn or Tin.