powerful effervescence of CO_2 ensues, and the liquid which was previously free from ammonia, now contains the ammonia salt of the acid which was employed, and which may be readily shown by the addition of caustic lime, when the ammonia will be liberated. It is evident that the acid when set free undergoes the same decomposition which was observed on evaporating the potassium compound.

Cyanic acid has, nevertheless, been obtained, and, indeed, under circumstances so interesting and so instructive, that I cannot refrain from entering into some details respecting its formation. In order that you may understand the train of experiments which has led to this result, I must remind you of the deportment exhibited by many mineral chlorides; when coming into contact with water, a decomposition of the latter ensues. We obtain hydrochloric acid, and an oxide of the element with which the chlorine was combined. I perform the experiment with terchloride of antimony. The action of water produces instantaneously a precipitate of white teroxide of antimony. If a compound of chlorine with cyanogen could be obtained, it would not be impossible that the action of water on this substance would produce the acid in question.

$$Sb\ Cl_2 + 3HO = Sb\ O_2 + 3\ H\ Cl.$$
$$Cy\ Cl + HO = Cy\ O + H\ Cl.$$

Now, chlorine combines with cyanogen very readily. It is only necessary to bring together in a suitable vessel cyanide of mercury and chlorine, when, on the one hand, chloride of mercury, and on the other, chloride of cyanogen, is produced. This body is a gas at the common temperature, but may be liquified by exposure to a frigorific mixture. In this state it may be preserved when sealed in strong glass tubes.

The deportment of this substance, however, greatly differed from what chemists had anticipated. It was found that water had no effect whatever upon this chloride. Indeed its formation is greatly facilitated by the presence of water, and I hold in my hand a solution of this gas in water, which was prepared some weeks ago. The penetrating odour, and the expulsion of an inflammable body upon application of heat, at once betray the presence of this compound. If the chloride of cyanogen gas be passed into a solution of potassa, decomposition ensues, chloride of potassium and cyanate of potassa are formed, but the latter undergoes almost instantaneously the decomposition which has been repeatedly mentioned; it is converted into carbonate with evolution of ammonia. The liquid chloride of cyanogen which is preserved in sealed tubes, passes, however, rapidly into a new modification, which exhibits a perfectly different deportment with potassa. After a few days, long slender crystals begin to appear in the liquid; these gradually augment, and after the lapse of a week or two, the whole liquid has solidified into a crystalline mass. On opening the tube we find there is no longer the slightest odour perceptible. The compound which previously boiled below the freezing point of water is now converted into a substance difficultly fusing and boiling at a temperature not much lower than the fusing point of tin. The analysis of this substance has led to the remarkable result, that it has exactly the same composition as the gaseous chloride of cyanogen. Now what explanation can be given of this difference of properties exhibited by two substances of exactly the same composition? This explanation has been furnished by the examination of the density of the two substances when in the state of vapour. And here you have an example of the valuable aid which the chemist derives from the important process which I had an opportunity of describing to you in one of the former lectures. This examination shows that the vapour density of the solid chloride of cyanogen is three times that of the chloride of cynogen gas; in other words, that in the passage of the gas into the solid the molecules have been approximated in such a manner that the same volume of gas, after the change has taken place, contains three times the weight of matter which was originally present in it. We accordingly represent the composition of the gaseous chloride by the formula.

$$Cy\ Cl.$$