

ALIEN PROPERTY CUSTODIAN

PROCESS FOR THE MANUFACTURE OF METALLIC GLUCINUM AND OF ITS ALLOYS

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A certain number of alkaline fluogluccinates, such as NaF.GlF_2 and 2NaF.GlF_2 , KF.GlF_2 and 2KF.GlF_2 , $2\text{NH}_4\text{F.GlF}_2$, 2LiF.GlF_2 , are already known, but nobody has ever mentioned a calcium fluogluccinate. On the other hand, the existence of the latter could not be foreseen, because aluminum and magnesium, which chemically come closest to glucinum, yield fluorinated alkaline compounds (such as cryolite: 3NaF.AlF_3 , potassium cryolite: 3KF.AlF_3 , the double fluoride NaF.MgF_2), but neither of them gives a fluorinated calcium compound.

I have found, and this is the object of the present invention, a definite fluorinated glucinum and calcium compound, constituting the calcium fluogluccinate, with the formula $\text{CaF}_2.\text{GlF}_2$ or CaGlF_4 . This is a well-defined composite salt, since the fluogluccinate CaGlF_4 is practically insoluble in water, while the glucinum fluoride GlF_2 is very soluble in the latter. On the other hand, the melting point of calcium fluogluccinate corresponds to a maximum of melting diagram CaF_2 versus GlF_2 . Lastly, the specific weight of calcium fluogluccinate, which is 2.9 at 20°C ., marks an important contraction upon the specific weight corresponding to a simple mixture of both these fluorides.

The fluogluccinate $\text{CaF}_2.\text{GlF}_2$ is easily obtained by melting a mixture in suitable proportions of glucinum fluoride and calcium fluoride, or a mixture in suitable proportions of glucinum and ammonium fluoride with calcium fluoride.

For its industrial preparation, sodium fluogluccinate 2NaF.GlF_2 can be melted together with the corresponding amount of calcium chloride, in a manner to set up the reaction:



The reaction product is washed out with water for eliminating the residual sodium chloride.

Industrially, the same reaction is carried out in water, by precipitating a solution of 2NaF.GlF_2 with the exactly required amount of a calcium chloride solution.

The required amount of hydrofluoric acid can also be reacted upon calcium glucinate CaO.GlO , which is easily obtainable by precipitating with lime various soluble industrial glucinum salts.

These methods of manufacture are not limitative; since the present invention concerns the calcium fluogluccinate as a new industrial product, all the classical chemical processes may be set up for its preparation.

The invention further concerns the various

industrial applications of the new product: $\text{CaF}_2.\text{GlF}_2$.

It is known to prepare glucinum alloys with metals which are less electropositive than glucinum, by reduction of reducible glucinum compounds by means of an alloy of the latter metals with magnesium. The use of the fluogluccinate $\text{CaF}_2.\text{GlF}_2$, object of the present invention, as reducible compound, permits an economy owing to the fact that the $\text{CaF}_2.\text{GlF}_2$ yields all its glucinum by reduction with a heavy magnesium alloy, whereas it is known, from the German Patent 675,526 of May 1934, that the sodium fluogluccinate, solely used up to the present as reducible compound, will only yield half of its glucinum content under the same reducing conditions, thus necessitating a rather costly operation for the recuperation of the glucinum in the residual baths.

It is thus possible to use industrially the calcium fluogluccinate $\text{CaF}_2.\text{GlF}_2$ for the preparation of glucinum alloys, for instance with copper, aluminum and zinc. In the case of the zinc alloy, it may be useful to lower the melting point of the fluogluccinate by adding a flux, as for instance CaCl_2 or MgCl_2 , in a manner to set up the reaction well below the boiling point of zinc.

A method for preparing pure glucinum is known, consisting in heating a zinc-glucinum alloy above $1,280^\circ \text{C}$. in order to distill the zinc and melt the glucinum. In this process of manufacture, an important economy is obtained, in the first preparation phase, starting from the zinc-glucinum alloy prepared by using the calcium fluogluccinate $\text{CaF}_2.\text{GlF}_2$ as a reducible compound of glucinum.

The same economy is also provided, in the manufacture of alloys of glucinum and of non-volatile metals, when the calcium fluogluccinate is used as reducible compound for obtaining the zinc alloy serving as a base (alloy of glucinum, zinc and non-volatile metals) by reduction of said calcium fluogluccinate by means of an alloy of magnesium, zinc and non-volatile metals which are to be alloyed to the glucinum,—said base alloy being subsequently heated to a temperature sufficient for distilling the zinc (above 1280°C .) and agglomerating, by melting, the residual alloy.

In the various reduction methods recalled above and which are by no means limitative, it is always feasible to add to the calcium fluogluccinate an excess of calcium fluoride, as well as suitable fluorinated or chlorinated fluxes.

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