Patented Sept. 9, 1930 1,775,589

UNITED STATES PATENT OFFICE

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PRODUCTION OF BERYLLIUM

No Drawing. Original application filed December 6, 1924, Serial No. 754,446. Divided and this application filed August 8, 1928. Serial No. 298,410.

The invention relates to the production of beryllium.

Beryllium, as reduced from its compounds by various processes, occurs in powder or other divided state. The present invention is a process whereby such divided metal can be brought into the reguline condition, and the process is applicable also in other cases where it is desired to produce a homogeneous body of solid beryllium, free from oxide.

The following is an example of a process whereby beryllium in comminuted form is produced by electrolysis. In the example the compound electrolyzed is beryllium chloride, preferably anhydrous and free from oxide, and the electrolysis is conducted in a container which serves also as cathode.

In order to recover 50 grams of coherent metal, it is necessary to electrolyze about one-half kilo of beryllium chlorid. The bath may consist, for example, of 2.5 kilos more or less of sodium chlorid, and the cathode pot should be large enough to hold such a bath. The pot should be provided with a cover, which may be dome-shaped. In a convenient arrangement of the apparatus, a dome-shaped cover having a small opening near one edge for the introduction of hydrogen during the electrolysis, and a larger hole near its center, is used. The anode which is preferably a heavy graphite rod passes through the central hole, which also serves for the introduction of the beryllium chlorid. The excess hydrogen together with hydrochloric acid equivalent to the evolved chlorin escapes through the central opening where the hydrogen burns. The electrolysis may be conducted as folows:

The charge of sodium chlorid is placed in the pot and melted and brought to about 825° C. in any suitable way. The cover and anode are put into place, and the stream of hydrogen started. About 125 grams of beryllium chlorid is then introduced and a current of about 150 amperes passed. About six volts is required. The decomposition of the initial charge of beryllium requires about 20 minutes and a second charge of the same size is then added. The remainder of the half-kilo of chlorid is added in two more lots at twenty-minute intervals and the electrolysis is continued about 35 minutes after the final addition.

The electric current and the hydrogen are then cut off, the cover and anode removed, and as much of the fused salt as possible is decanted, leaving the beryllium clinging to the inner wall of the pot. When the pot is cold, the residual material is removed from it and is rapidly leached with ice-water until the metal is free from soluble matter. The metal may then be washed with alcohol, preferably anhydrous, and dried. It is in the form of large bright crystalline plates and spangles.

If the beryllium is heated in this divided condition it oxidizes rapidly, and will neither form a regulus nor alloy with other metals present. To bring it into coherent form it is pressed in steel dies under several tons pressure into strong rods, discs or the like. When these are heated to about 1200–1450° C. in a tightly closed crucible under a fused salt, such as sodium or barium chlorid, the particles of metal coalesce, and coherent ingots of bright metal can be produced.

This application is a division of my pending application Serial No. 754,446, filed December 6, 1924.

I claim:

1. The process which comprises pressing comminuted beryllium into a coherent body, and melting said body under a molten flux not reactive therewith, said flux consisting of halide of the alkali metal and alkaline earth metal groups.

2. The process which comprises pressing comminuted beryllium into a coherent body, and melting said body under a molten flux not reactive therewith, said flux consisting of barium chloride.

3. The process which comprises electrodepositing beryllium in comminuted form at a temperature below its melting point, pressing the comminuted metal into a coherent body, and melting said body under a molten flux not reactive therewith, said flux consisting of halide of the alkali metal and alkaline earth metal groups.

4. The process which comprises electrode-

positing beryllium in comminuted form at a temperature below its melting point, pressing the comminuted metal into a coherent body, and melting said body under a molten flux not reactive therewith, said flux consisting of barium chloride.

In testimony whereof, I affix my signature.

HUGH S. COOPER.