

UNITED STATES PATENT OFFICE.

CLAUDE THEODORE JAMES VAUTIN, OF LONDON, ENGLAND.

PROCESS OF MAKING ALUMINUM SULFID.

SPECIFICATION forming part of Letters Patent No. 513,660, dated January 30, 1894.

Application filed March 8, 1893. Serial No. 465,164. (No specimens.)

To all whom it may concern:

Be it known that I, CLAUDE THEODORE JAMES VAUTIN, residing at London, England, have invented an Improved Process for the Manufacture of Aluminum Sulfid, of which the following is a specification.

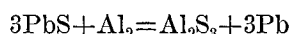
My invention relates to the production of aluminum sulfid (Al_2S_3) from metallic aluminum by the reaction of the latter upon, and consequent reduction of a metallic sulfid, such as lead sulfid (PbS) of which the base is electro negative to aluminum at a melting temperature and which sulfid is completely decomposed by metallic aluminum at the temperature of a bright red heat namely 900° or $1,000^\circ$ centigrade.

In one method of carrying out my process, I place metallic aluminum slightly in excess of the theoretical quantity necessary to decompose a given weight of lead sulfid in a crucible or on the bed of a reverberatory furnace. I find plumbago crucibles answer well, and when a furnace is used it should be preferably gas fired and of a neutral atmosphere, and should be lined with a basic or neutral material. On the top of the said metallic aluminum, I place the lead sulfid or galena, which must be in a finely divided condition not larger than will pass through a one-fourth inch mesh to prevent the violent volatilization and reaction which would occur with large pieces, and the temperature is raised to a bright red heat about 900° or $1,000^\circ$ centigrade sufficient to melt the lead sulfid and aluminum and to retain the aluminum sulfid formed in a molten condition. When the reaction is completed the contents are poured or tapped into a mold preferably of considerable depth as compared with its breadth. When cold the contents are removed from the mold, and metallic lead will be found at the bottom of the mass and aluminum sulfid in a distinct stratum at the top. The excess of the aluminum which was placed in the crucible over the theoretical quantity that was required for

the reduction of the lead sulfid will be found on the top of the lead and non-alloyed with the bulk of the lead or the sulfid of aluminum and therefore easily detached. This excess of aluminum is added to insure the complete reduction of the lead sulfid so that the resulting aluminum sulfid will be free from undecomposed sulfid of lead.

If natural sulfid of lead (galena) has been used, and contains silver or gold or both and other impurities the gold and silver and other metallic impurities will be found to contain the excess of aluminum, and the valuable parts may be easily recovered therefrom or the resulting alloy may be found to be of commercial value, or the aluminum may be recovered for re-use.

The chemical re-action involved in the above process may be expressed thus:



The complete reduction of the lead sulfid is insured by the excess of aluminum and by the non-alloying of the lead and aluminum which also enables the respective products of lead, aluminum sulfid and excess of aluminum to be readily and mechanically detached from one another.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

The process of producing aluminum sulfid which consists in melting together metallic aluminum and lead sulfid at a bright red heat producing metallic lead and aluminum sulfid and finally separating the respective products, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CLAUDE THEODORE JAMES VAUTIN.

Witnesses:

RICHARD A. HOFFMANN,
CHARLES H. CARTER.