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COMPOSITE INCENDIARY POWDER CONTAINING METAL COATED OXIDIZING SALTS

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The invention described herein may be manufactured and used by or for the government for governmental purposes without payment to me of any royalty thereon.

This invention relates to a composite type of incendiary powder and the process of preparing same.

The object of this invention is the production of an incendiary powder by treating a powdered compound containing an excess of oxygen with an exothermic metal to coat the powder with the metallic vapor of the exothermic metal.

It is a further object to employ only solid oxygen bearing materials that contain an excess of oxygen or one that liberates free oxygen when heated.

It is a still further object to coat the solid oxygen bearing material with an exothermic metal, without decomposition of the powdered material, or the loss of any of the excess oxygen.

From the supply of solid oxygen bearing materials, potassium perchlorate is chosen for treatment but any of the following also could be used such as sodium perchlorate, barium perchlorate, potassium nitrate, sodium nitrate, barium nitrate, and sodium chlorate.

Aluminum is the metal chosen as the exothermic metal to coat the powdered oxygen bearing material but it should be noted that magnesium titanium, and alloys of aluminum and magnesium can also be used. Such alloys should contain from 30–70% aluminum and the balance magnesium in order to be effective.

The deposition of aluminum on potassium perchlorate is accomplished by treating the powdered potassium perchlorate at an ambient pressure of 5×10^{-6} mm. of mercury with aluminum vapor obtained by heating aluminum wire or ribbon with tungsten wire filaments sufficient to obtain evaporation of the metal. The aluminum vapor is deposited on the perchlorate powder in this treatment without decomposing the potassium perchlorate or the compound deprived of any of the excess oxygen which it contains.

The appearance of the aluminum coated potasium perchlorate is similar to that of aluminum powder. The thickness of the aluminum coating is dependent on the time of the exposure of the potassium perchlorate, to the evaporating metal. The desirable thickness of aluminum, on 40–80 mesh potassium perchlorate, is equivalent to

that which results in a product containing from thirty to eighty percent of aluminum by weight. Storage of this coated powder in sealed containers has resulted in negligible variations in the physical properties of the composite incendiary.

Some of the specific uses for this coated powder may be as an incendiary component, as a solid rocket fuel additive, or as a metal heating powder. The liberation of the oxygen in the coated potassium perchlorate can be accomplished by thermal decomposition. If the coated product is introduced to an initiating agent, such as a flame or an electrical impulse, the initiating source causes decomposition of the potassium perchlorate and subsequent reaction of the evolved oxygen and the aluminum metal coating. This reaction becomes self-sustaining after the initiation has been accomplished.

Having more particularly described this invention, what is claimed is:

1. An incendiary powder consisting essentially of powdered potassium perchlorate having a coating of 30 to 80% by weight of aluminum without loss of the excess oxygen of the perchlorate.

2. An incendiary powder consisting essentially of a powdered potassium perchlorate having a coating of 30 to 80% by weight of magnesium without loss of the excess oxygen of the perchlorate.

3. An incendiary powder consisting essentially of a powdered potassium perchlorate having a coating of 30 to 80% by weight of titanium without loss of the excess oxygen of the perchlorate.

4. An incendiary powder consisting essentially of a powdered oxygen-containing compound selected from the group consisting of potassium, sodium and barium salts of chlorates, perchlorates and nitrates having a coating of 30 to 80% by weight of an exothermic metal selected from the group consisting of aluminum, magnesium, titanium and a magnesium-aluminum alloy containing 30 to 70 percent aluminum.

5. An incendiary powder consisting essentially of 40 to 80 mesh powdered potassium perchlorate having a coating of aluminum without loss of the excess oxygen content of the perchlorate and containing 30 to 80 percent by weight of aluminum.

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