

FACSIMILE COVER LETTER

TO: Kent Morton
COMPANY: Giant Mine - Royal Oak
FROM: Ron Hatch
DATE: Jan 10, 1997
SUBJECT: Arsenic oxide condensation
NUMBER OF PAGES INCLUDING COVER LETTER: 3

MESSAGE:

Kent: I reviewed my files on the subject
and I believe this is where we left
the matter.

I have access to some of the references in
this note.

If I can be of further help, please let
me know.

Best regards,
Ron.

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May 11, 1990

Kent Morton,
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Dear Kent,

With regards to the hot filtration and condensation of an arsenic product the following comments are given.

I agree with your concern regarding the environmental problems associated with the production of a fine dusty product. We have reasonable confidence that compaction will give a flaked product providing 4-5 % moisture is added to the As_2O_3 . It is nevertheless an add-on operation that is prone to environmental problems in itself. Anything that can be done to produce a granular product at the condensation stage should be investigated.

Several alternatives come to mind. There are cold surface condensers that are used on an industrial scale. I recently learned that a company in France (Racine ?) condenses arsenic onto cold pipes and uses some rattling device to release some or all of the arsenic from them. How well this works I have no details. Are you aware of this ? I could follow up on this and probably get additional information.

Large scale condensers are used in the chemical industry to condense mainly organic chemicals from the gas phase. I have attached parts of patents which may be of interest.

The horizontal condenser of Gerardus van Heel (U.S. 4,055,397) is designed to cycle , condensing on the walls and then supplying heat to dislodge the condensate, - not suited to our As_2O_3 material.

The apparatus by G.Sloan uses a helical scraper. This is a small unit and not designed for condensation from a flowing gas stream.

Similarly the apparatus of Miller et al (U.S. 3,705,617) is not designed for continuous withdrawal of the product.

The apparatus by Langbrook et al (U.S.3,961,665) relies on batch heating - discharge and is not applicable to As_2O_3 .

The article by Zawala shows two large scale sublimator - condensers. The drum is interesting. I doubt that these units are carrier gas sublimators but are likely vacuum units with low gas flow.

A very interesting "Discussion of the prior art " is given in U.S. patent 4,036,594 (Ibing et al). The use of solid balls which absorb heat and becomes coated is interesting , but mechanically complicated.

I am of the opinion at this point, that the simplest and most effective way to produce a granular product is to use a fluid bed . It could be operated with cold air mixing or preferably with only bed cooling .This could be done using a heat exchanger in the bed or having a continuously circulating bed with solids cooling. I would like to do some calculations to see what size, heat load etc. would be required for a pilot plant unit and also a full scale plant unit. A fluid bed unit could give a controlled particle size. I believe that a 50 - 200 micron product would have excellent handling properties .

On the subject of the higher pressure drop across the hot filter, I believe that a hot booster fan after the filter (+400 deg. C) is the most practical approach .

I will discuss our plan of action after you have considered these comments.

Best regards ,
Ron

Ron Hatch