

[54] **PRODUCTION OF PURIFIED STRONG WET-PROCESS PHOSPHORIC ACID**

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[21] Appl. No.: **417,804**

[22] Filed: **Sep. 13, 1982**

[51] Int. Cl.³ **C01B 25/16**

[52] U.S. Cl. **423/321 R**

[57] **ABSTRACT**

The concentration of impurities in wet-process phosphoric acid limits the usefulness of the acid for the production of fertilizers, feed-grade phosphate and detergents. The aluminum, magnesium, and fluoride impurities are removed with the calcium sulfate hemihydrate filter cake by hydrolyzing and recycling the off-gas scrubber solutions in the presence of a ferric iron catalyst. The aluminum and magnesium are reduced to less than 0.1 percent in the acid product by the precipitation

of $(Ca,Mg)Al_2F_8 \cdot 2H_2O$, which is acid insoluble and suitable for storage with the byproduct calcium sulfate. Ferric iron also serves as a catalyst for the simultaneous precipitation of $(Na,K)_2SiF_6$. Subsequent additions of potassium as, for example, in the teachings of Gilbert (U.S. Pat. No. 3,338,675), can then be applied to obtain a purified phosphoric acid product suitable for most commercial applications. The added potassium serves two purposes in the 40 to 55 percent P_2O_5 acid since ferric iron is reduced to 0.25 percent Fe_2O_3 by the precipitation of $Fe_3KH_{14}(PO_4)_8 \cdot 4H_2O$ and the SiF_6^- is reduced to about 0.2 percent by the precipitation of K_2SiF_6 . This subsequent precipitate contains about 50 percent P_2O_5 and is as effective as superphosphate $[Ca(H_2PO_4)_2 \cdot H_2O]$ in supporting plant growth.

**41 Claims, No Sheets Drawing,
41 Pages Specification**

The file of this unexamined application may be inspected and copies thereof may be purchased (849 O.G. 1221, Apr. 9, 1968).