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PRODUCTION OF PHOSPHORIC ACID

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The present invention relates to the production of phosphoric acid from oxygen compounds of phosphorus which are still capable of being further oxidized. More particularly the present invention relates to the treatment of phosphoric acid containing phosphorous acid such as is obtained by the catalytic oxidation of phosphorus by means of water or steam; in such crude phosphoric acid the content in phosphorous acid is troublesome when the phosphoric acid is to be used for the production of fertilizers, so that it is essential to oxidize the phosphorous acid contained therein before the acid can be made use of for the said purpose. Such oxidation cannot be effected by the usual oxidizing agents such as air or chlorine. The oxidation can be carried through with the aid of nitric acid, but leads to success only when the nitric acid is used in excess and when the content of the solution in phosphoric acid and phosphorous acid is at least 60 per cent.

We have now found that a practically complete oxidation of oxygen compounds of phosphorus, which are still capable of being further oxidized, can be carried through with the amount of nitric acid theoretically necessary if the operation is carried out at temperatures above 80° C. and in a confined reaction space, that is in a closed vessel and accordingly under an elevated pressure. This manner of working may even successfully be applied to solutions of a lower concentration than 60 per cent, for example to solutions containing only 45 per cent of phosphoric and phosphorous acids. The oxides of nitrogen evolved during the reaction may separately be regenerated by means of air or oxygen, whereby they are converted into nitrogen dioxide and nitric acid and can then be used over again for the oxidation.

The following example will further illustrate the nature of this invention, but the invention is not limited to this example.

Example

An aqueous solution of phosphoric acid having a specific gravity of 1.4 and containing 1.95 per cent of phosphorous acid (calculated with reference to the phosphoric acid present) is mixed with the amount of nitric acid theoretically necessary for the oxidation of the phosphorous acid. The mixture is heated in an autoclave to 120° C. whereby the pressure increases to 1.3 atmospheres. After the treatment the phosphoric acid contains only about 0.05 per cent of phosphorous acid.

What we claim is:—

1. In the production of phosphoric acid by oxidizing oxygen compounds of phosphorus still capable of being further oxidized by means of nitric acid, the step which comprises carrying out the oxidation with the amount of nitric acid theoretically required at a temperature above 80° C. and in a confined reaction space.

2. In the production of practically pure phosphoric acid from phosphoric acid containing phosphorous acid by means of nitric acid, the step which comprises carrying out the oxidation with the amount of nitric acid theoretically required at a temperature above 80° C. and in a confined reaction space.

3. A process as claimed in claim 2 in which the reaction temperature is about 120° C.

In testimony whereof we have hereunto set our hands.

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