Method Of Extraction Of Phosphate Acid And Increasing Its Concentration

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Abstract
This in the article extraction phosphoric acid extraction methods , results was extraction phosphate from acid feed amount high was good quality fertilizer acquisition technologies presented.The result was In the EPA fluorine amount reduce methods seen .
Keywords:.EPA, sulfate acid, dihydrate method, gypsum , $K_{div.}$, K_{wash} . K_{com} .

Literature Description: From phosphorites extraction to obtain phosphoric acid (EPA) Use 93% sulfuric acid for is preferable . In this technological in process water balance improves– plaster washing many in quantity done with water increase opportunity is created. As a result to the trash removable phosphogypsum - removable phosphoric acid and neutralization necessary was sewage waters amount decreases.
Acid concentration increase removable phosphate the amount of P_2O_5 in the acid does not change, plaster crystallization acceptable conditions through in advance is determined. Next higher concentrated when using sulfuric acid heat separation (dilution) the heat increase (at the expense of) sharply increases , and it from the system separate to take demand is being done .
Dehydrated in a way in the production of phosphoric acid phosphate raw thing in the content all of fluorine (mainly SiF_4 (in the form of) only 3-5% gas is phase separated, approximately 80% to the EPA, and 15-17% to to phosphogypsum will pass. Cooling method and of the fan to transfer related without from the extractor separate removable gas in the content fluorides concentration, fluorine 0,2-2,5g/m^3 what organization Extraction in the shop installed absorption systems , mainly waste gases cleaning for intended , in which harvest H_2SiF_6 will be of weak solutions neutralization to the stations will be sent or phosphogypsum wash for is used .
Practical part Natural from phosphates extraction phosphoric acid production release indicators analytical information according to is determined :
P_2O_5 of technological yield (K_{yield} ,%), i.e.P_2O_5 of raw from the material phosphate to acid transition level apatite again in operation – 95-96 % and various phosphorites for – 71-94 % organization does . U P_2O_5 of to the solution divorce coefficient ($K_{div.}$, %) by 2-3 % is small . This phosphogypsum phosphate from acid washing full explained by the absence of : washing The coefficient ($K_{washing}$,%) is usually 97-99% . organization However:K yield = K_{yield} K_{wash} / $_{100}$ g equal to . Extraction dehydrated in the way to acid P_2O_5 of productive (farm) output 93-95 % organization it will , so suitable 1 t of P_2O_5 product contains 2,73-2,65 t of apatite (1075-1045 kg of P_2O_5) and 2,48-2,45 t (CaO what tie for stoichiometric standard,i.e.0,915 t) of 100% sulfuric acid is consumed per 1 t of apatite . Phosphorites again at work spending coefficients apatites again at work relative to : phosphate 1,5-2,3 times ; phosphate P_2O_5 in the composition 1,02-1,27 times for sulfuric acid ; 1,2-1,7 times for sulfuric acid is bigger . Raw material expenses EPA works release general 70-80% of their expenses organization will reach .
From apatite dehydrated in a way The obtained EPA contains:25-32% P_2O_5 ; 1,8-2,8% SO_3 ; 0,1-0,4% CaO ; 0,3-0,4% Al_2O_3 ; 0,3-0,5% Fe_2O_3 ; 1,7-2% F.

Within the EPA fluorine mainly H_2SiF_6 in the form of will be . Acid from fluorine cleaning , H_2SiF_6 what sodium , potassium , barium salting through transfer Usually 1 liter of phosphate 30-40 g NaCl per kilo is added .

$H_2SiF_6 + 2NaCl = \downarrow Na_2SiF_6 + 2HCl$

Reaction according to harvest to be less soluble sodium silicon fluoride to sink falls and initially paused , then centrifugation and filtering separated by a path is taken . So up to 75-85% fluorine separated and phosphate acidic his/her amount up to 0.2 -0.3 % decreases . Sodium defluorinated with chloride phosphoric acid, especially at high temperatures when increased of equipment strong to corrosion reason will be . That's why for acid evaporation to concentrate by means of necessity at birth , defluoridation soda or sodium phosphate using done is increased.

Double superphosphate , ammophos , nitroammofoska working release for 45-55% P_2O_5 caught phosphoric acid, ammonium polyphosphates and liquid fertilizers to take for and phosphate with 72-83% P_2O_5 acids demand Such in cases extraction Phosphoric acid is evaporated . It is known that every What is (98%

H_3PO_4 up to) concentration clean phosphate acid steam only from water consists of , theoretical to evaporate it when it is taken through high concentrated solutions to take possible . In practice and equipment of materials corrosion on account of evaporation difficulty gives birth . Temperature and acid concentration corrosion with increasing accelerates . From this except for concentration with increasing acid content additions solubility sharp decrease on account of to sink falls . Precipitation remains heated surface internal to the surface sitting mold, heat exchange worsens.

Extraction phosphate acidify concentration with the increase in it melted hexafluorosilicate The vapor pressure of the acid also increases . This because of phosphate 52-57% of acid P_2O_5 until in evaporation elementary acidic 80-90% of fluorine is gaseous to phase separated comes out and in this case in the EPA fluorine amount up to 0,5 -0,8 % decreases .

The EPA evaporation for bubbling concentrators – acid-resistant material cameras are also used , in which evaporation acid surface layer through turned on boiling gas to give through done is increased . Here heat transmitter surface no , heat exchange boiling gas and acid straight away from the collision done increases ; in this harvest to be sediment hanging in case remains and together with acid from the apparatus comes out , then it is cut off through cleaned. To the camera oven gases at a temperature of 650-900 ^oC is given . Especially natural gas combustible graphite immersion with burner concentrators effective works . Bubble concentrator and immersion with burner in equipment gas together with himself quite a bit in quantity phosphoric acid vapor take comes out , and it in electrostatic precipitators holding stay necessary It contains 8.5-9 g/ m^3 fluorine (electrofilter) to from the entrance before mixing with air (at the expense of – 3 g/m^3) waste gases in cleaning many quantitative P_2O_5 H_2SiF_6solution are taken ; they use difficulty gives birth to . Fog harvest to be – P_2O_5 loss increases, from this outside environment pollution reason will be. Such equipment more superphosphate acids to take for is used . In this case to evaporate contains 54-55% P_2O_5 caught solutions (from a vacuum evaporator) then) is given . Such goals for heater to the camera high steam under pressure (~3 MPa) is transmitted vacuum-evaporated equipment is also used possible.

Conclusion. Present at the time bubbling concentrators in place further improved , high at the level from the heat user with airlift equipment is being used. They internal part graphite protected by a pipe vertical steel from the pipe consists of . His evaporative acid injection bottom from the part boiling gas flow sent , produced to be gas-liquid mixture high from the part is released . Liquid from separation then and from the heat vaporizable acid in heating from use then , waste gas, absorption acid fog in devices, SiF_4 and from HF is cleaned . Liquid complex fertilizers working release for intended , contains 68-70% P_2O_5 to take acid for to concentrate two consecutively in stages : in the 1st from 52-54 to 64% , and in the 2nd - 68-70% P_2O_5 until is held .

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