

Phosphate From Raw Materials Extraction To Obtain Phosphoric Acid

Zakirova Sadokat Erkinaliyevna¹, Najmiddinov Rixcitilla Yunusali's son²,
Nodirov Alisher Avazovich³

Namangan davs technique 1st year university master's student ¹, Namangan state technique Associate Professor ², Namangan State University pedagogy Associate Professor of the Institute ³

Abstract

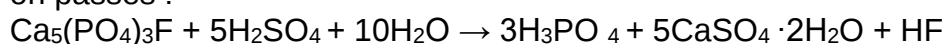
This in the article extraction to obtain phosphoric acid process scientific basics , raw materials, chemical reactions , technological stages and ecological-economic aspects wide analysis It is made from phosphorites. using sulfuric acid phosphate acid to take modern technologies , extraction mechanism and cleaning methods illuminated. Also , waste reduce , phosphogypsum again work and resource economical technologies current to grow opportunities scientific basically studied.

Keywords: Phosphoric acid, extraction , phosphorite , sulfuric acid, D2EHPA, TBP, phosphogypsum , technology , ecology , innovation.

Introduction. Phosphate acids chemistry industry main from products one is considered. They are used in mineral fertilizers , food , metallurgy , and other many on the networks wide Phosphate acid to take two main method available : thermal and extraction. Extraction method , that is wet process , economic efficiency and distinguished by its simplicity This is in the article extraction phosphate acid to take chemical and technological aspects deep analysis will be done.

Literature Description: Phosphate acids – phosphorus oxide water effect or phosphorites decomposition by acids as a result removable are compounds. Thermal in a way phosphorus in the air burned , harvested which is P_4O_{10} oxide reacts with water enters. Extraction in a way and natural phosphorites sulfuric acid treatment is given. Reaction as a result harvest was in solution phosphate acid and gypsum ($CaSO_4 \cdot 2H_2O$) is present will be. Extraction phosphate acid advantage that is , it is raw material as directly phosphorite uses and less energy spends.

Practical Part. Extraction to obtain phosphoric acid process following chemical equation based on passes :



Harvest was solution in the composition main product – phosphate with acid iron , aluminum , magnesium , fluorine and other mixtures will be. Such from the solution to obtain pure H_3PO_4 for extraction process is applied. Extraction — liquid phases between of substances to the distribution based physicochemical is a process. Extraction in the process used main extractants — di-2-ethylhydroxyethylphosphonic acid (D2EHPA) and tributyl phosphate (TBP). These substances organic in solutions interphase distribution ability high are , they are using phosphate acid juicy from the solution organic to phase The process is carried out main stages : extraction , scrubbing , and stripping (re- separation). Optimal result to take pH around 1–2 , temperature 25–35°C , phases ratio and from 1:1 to 1:3 is selected. Extraction phosphate acid working in the release harvest to be main waste is phosphogypsum. Phosphogypsum in the composition fluorine, heavy metals and radionuclides existence because of the environment for dangerous. Therefore , it should be recycled. work or construction materials as use according to research take The process is underway. economic efficiency high , because raw material cheap , energy expense less and product size big. Last in years extraction ion-exchange , membrane-based, in the production of phosphoric acid filtering , and plasma cleaning methods such as innovative technologies current are being done. These acid content through impurities level reduce waste reduce and precious elements (e.g. uranium , cesium , neodymium) restoration opportunity there is.

Conclusion. Extraction to obtain phosphoric acid method chemistry in the industry the most effective and economic in terms of acceptable This is method through high good quality phosphate acid is also useful additional products to take possible. The process in improvement energy economical , ecological clean technologies current to grow current from tasks is one.

Used literature

1. B.E. Sultonov, E.S.Nozimov, D.S. Kholmatov. Obtaining activated phosphorus fertilizers on the base of local phosphate waste //"Prospects of development of Science and Education" №17, December, 2023, pp.7-10, <https://humoscience.com/index.php/pdce/article/view/2375/4227>
2. B.E. Sultonov, E.S.Nozimov, D.S. Kholmatov. Recycling of local phosphate waste-mineralized mass into activated phgosphorus fertilizers // Chemical Science International Journal, Volume 32, Issue 6, page 108-114, 2023; Article no. CSIJ.110442.
- 3.Nozimov, E., Sultanov, B., Kholmatov, D., Sherkuziev, D., & Nodirov, A. (2024). Phosphorus fertilizer technology activated from phosphorus powder and mineralized mass. Scientific and Technical Journal of Namangan Institute of Engineering and Technology, 9(2), 129-134.
- 4.Nodirov, A. A., Sultonov, B. E., Sherkuziyev, D. S., & Abdulxayev, A. A. (2025, July). Research of the composition of phosphogypsum produced during the extracting of phosphoric acid from mineralized mass by the clinker method. In AIP Conference Proceedings (Vol. 3304, No. 1, p. 040021). AIP Publishing LLC.
- 5.Nodirov, A. A., Sultonov, B. E., Abdullajanov, O. A., & Kholmatov, D. S. (2021). The clinker method of extracting phosphoric acid from Central Kyzylkum phosphorites. Scientific Bulletin of NamSU, 7, 69-75.
- 6.Sultonov B. E., Nodirov A. A., Xolmatov D. S. Research of the Composition of Phosphogypsum Produced During the Extracting of Phosphoric Acid from Ordinary Phosphorite Powder by the Clinker Method //Chemical Science International Journal. – 2023. – T. 32. – №. 2. – C. 51-58.
- 7.Avazovich Nodirov Alisher, Sultonov Bohodir Elbekovich, and Holmatov Dilshod Sattorjonovich. "The main chemical composition of phosphogypsum. formed at the obtaining of extraction phosphoric acid by clinker method." International scientific review LXXXIX (2023): 6-8.
- 8.Нодиров, А. А., Султонов, Б. Э., & Холматов, Д. С. (2022). Влияние нормы и концентрации серной кислоты на параметры экстракционной фосфорной кислоты, полученных клинкерным способом из мытого обожженного фосфоритового концентрата. Universum: технические науки, (3-5 (96)), 38-43.
- 9.Nodirov Alisher Avazovich; Nozimov E'zoz Sadikzhanovich; Azimjonov Shohjahon, Extraction Phosphoric Acid From Washed Calcined Phosphorite Concentrate, TLEP–International Journal of Multidiscipline, 284-286. 2025/9/27
- 10.Elbekovich Sultonov Boxodir; Avazovich Nodirov Alisher; Sattorjonovich Xolmatov Dilshod; Abdulaziz o'g'li Abdullajanov Oybek. EKSTRAKSION FOSFAT KISLOTA OLISHNING YARIMGIDRATLI VA YARIMGIDRAT-DIGIDRATLI USULI. Euro-Asia Conferences 2021/1/20. 516-518