Technology of Receiving Polyphosphate Fertilizer from Waste by Project of Industrialization in Phosphorus Industry

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Development program of Dzhambul region in 2011-2015 focused on industrialization in the chemical industry, agro-food and light industry. 19 investment projects are in the process of implementing, nowadays [1].

Over the forty years of existence in the Dzhambul region accumulated wastes of phosphorus fertilizer industry requires utilization.

In the process of receiving yellow phosphorus in the ore-thermal furnaces produces dust that is captured in the electrostatic type of Kotrel and after shaking washed off with water. Received suspension is called Kotrel "milk" and pumped to the slurry tank.

We investigated the possibility of using Kotrel "milk" to obtain calcium polyphosphate.

The main and complex stage of obtaining polyphosphate product is drying the phosphate slurry. The last activity of the experience is the melt of polymerized phosphoric acid. Here products of disproportionation of dihydrogen phosphate calcium are added to existing unreacted phosphoric acid by the scheme:

$$\text{Ca(H}_3\text{PO}_4)_2 \xrightarrow{\text{evap}} \text{CaHPO}_4 + \text{H}_3\text{PO}_4$$

The optimal temperature range for drying and granulation polyphosphate pulp is 180-200°C.

Analysis of granulated and dried intermediate product were as follows (weight %):

$$\text{P}_2\text{O}_5\text{ total} \sim 36-38; \text{ P}_2\text{O}_5\text{ dig} \sim 33-35; \text{ P}_2\text{O}_5\text{aq} \sim 20-30; \text{ P}_2\text{O}_5\text{free} \sim 3,3-4,8.$$

Intermediate product, which was calcined in the laboratory conditions at 280-320°C, corresponds to the LTCPP requirements and contains:

$$\text{P}_2\text{O}_5\text{ total} \sim 41 – 44\%; \text{ P}_2\text{O}_5\text{aq} \sim 20-25\%; \text{ P}_2\text{O}_5\text{free} \sim 1-3\%.$$

Nowadays, investment projects are being realized and the project of Russian chemical company “EuroChem”, which wants to invest significant resources in the production of phosphorus and fertilizers in Kazakhstan, has been planned. There is hope for utilization of chemical waste, which is accumulated over the years by our technology.

REFERENCES