COMPLEX FERTILIZERS BASED ON PHOSPHORITES OF CENTRAL KYZYLKUM

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Abstract: *in this study, the production of complex fertilizers based on mineral acids and low-grade phosphorites was studied. In this case, samples of low-grade phosphorite were activated with nitric and sulfuric acids at a stoichiometric rate with respect to phosphorite-containing calcium oxide. The stoichiometric values of nitric and sulfuric acid for the decomposition of phosphorite were calculated at 100% (nitric and sulfuric acids = from 100: 0 to 30:70). The rate of decomposition of phosphorite varies with acidity, and with an increase in the proportion of sulfuric acid in relation to nitric acid, the total permeability for plants of P_2O_5 and CaO, P_2O_5 increased compared to the total, but it was found that CaO in a variable form can be reduced to total.*
Keywords: *phosphorite, nitric acid, sulfuric acid, calcium oxide, nitrogen.*

КОМПЛЕКСНЫЕ УДОБРЕНИЯ НА ОСНОВЕ ФОСФОРИТОВ ЦЕНТРАЛЬНЫХ КЫЗЫЛКУМОВ

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Аннотация: *в данном исследовании изучалось производство комплексных удобрений на основе минеральных кислот и низкосортных фосфоритов. В этом случае образцы низкосортного фосфорита активировали азотной и серной кислотами со стехиометрической скоростью по отношению к фосфоритсодержащему оксиду кальция. Стехиометрические значения азотной и серной кислоты для разложения фосфорита были рассчитаны на 100% (азотная и серная кислоты = от 100: 0 до 30:70). Скорость разложения фосфорита варьируется в зависимости от кислотности, и с увеличением доли серной кислоты по отношению к азотной кислоте общая проницаемость для растений P_2O_5 и CaO, P_2O_5 увеличивалась по сравнению с общей, но было обнаружено, что CaO в переменная форма быть сведенным к общему*
Ключевые слова: *фосфорит, азотная кислота, серная кислота, оксид кальция, азот.*

The technology of decomposition of phosphorites on the basis of nitric acid allows the use of primary technological raw materials and their complete processing into commercial products, including complex fertilizers. In some countries, the method of processing phosphorite raw materials in nitric acid plays a leading role. In the XXI century, new capacities for the processing of raw materials by the method of nitric acid are being launched. In addition, the presence of excess calcium in the form of $Ca(NO_3)_2$ in the compound formed during the decomposition of phosphorites in nitric acid adversely affects the physicochemical properties of the fertilizer. Due to the fact that the decomposition of nitric acid has several disadvantages, the use of combined methods in the decomposition of phosphorite in the combination of nitric and sulfuric acids, the resulting fertilizer is additionally enriched with sulfur and improves the properties of the product. Scientific work on the decomposition of phosphorites on the basis of nitric acid is being carried out by our scientists, who have studied the production of various mineral and organomineral fertilizers [1-4].

Modern scientific and technical development in the field of phosphorus fertilizers includes the introduction of non-traditional methods of processing low-grade phosphorites, ie the development of technology for the production of primary phosphorus and complex fertilizers by activating phosphorites by processing them with less acid than required for complete decomposition. It is necessary to determine the optimal conditions for the activation of nitric and nitric sulfate acids. Based on the above, we set ourselves the goal of studying the process of obtaining NPSCa-fertilizers to accelerate the process of nitric acid

activation of phosphorite by nitric acid activation of low-grade phosphorite and the addition of sulfuric acid. In order to study this process, experimental work was carried out to obtain a fertilizer containing NPSCa based on low-grade phosphorite, nitric and sulfuric acids. The composition of all the raw materials was studied before the experiments were carried out. Then the stoichiometric norms of nitric and sulfuric acid for decomposition of phosphorite samples are 100% (nitric and sulfuric acid = 100: 0-30: 70) was calculated relative to the calcium oxide in the raw material.

The results of chemical analysis of the resulting sample show that the decomposition rates of phosphorite vary depending on the acid content, and with the increase of the sulfuric acid ratio relative to nitric acid, the total P2O5 and CaO, P_2O_5 it was found that plant absorption increased relative to total but the plant absorption form of CaO decreased relative to total. For example, when the stoichiometric norms of nitric and sulfuric acid in the decomposition of phosphorite are 100:10, P_2O_5, the total and plant-absorbing form of CaO, the plant-absorbing form of CaO is 6.0%, 17.01% and 5.35%, 15.53%, acidity was 100.40, 6.80%, 19.30% and 6.33%, 17.05%, respectively. when the norms were 100:70, they were 7.83%, 22.20%, and 7.43%, respectively, 18.96%. The plant susceptibility of P_2O_5 and CaO was 89.12% and 91.25%, respectively, when the stoichiometric norms of nitric and sulfuric acids were 100:10 and the acid norms were 100:40, respectively. 93.07% and 88.34%, respectively, while the acid norms were 100.90 and 94.96% and 85.39%, respectively.

It can be concluded from the study that the general form of P_2O_5, CaO and SO_3, the ratio of P_2O_5 to the total plant absorption, the total carbon an increase in the decarbonization rate of the four oxides was found, as well as a decrease in the ratio of total nitrogen and CaO to total plant uptake.

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