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GYPSUAL MATERIALS BASED ON LOCAL AND SECONDARY RAW MATERIALS FOR CONSTRUCTION PURPOSES

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Abstract: In connection with the growth of industrial, civil and housing construction in Uzbekistan, the demand for finishing building materials based on cement and gypsum has sharply increased. The most widely used materials for the interior decoration of buildings under construction are materials based on gypsum.

Keywords: Filler, water repellent, heat resistance, slaked lime, powdered silica.

Introduction

Since independence and the establishment of market relations in the Republic of Uzbekistan, fundamental changes have taken place in all branches of industrial production, including in the construction industry. Due to the growth of industrial, civil and residential construction, the demand for finishing building materials based on cement and gypsum has increased dramatically. Gypsum-based materials are the most widely used for interior decoration of buildings under construction [1]. Their advantages are significantly lower than for lime and cement production, fuel consumption during production, sufficiently high strength, fast hardening and rapid strength gain. A generalized formulation of the gypsum system used for the production of both products and inorganic powder composite materials based on it. It consists mainly of a gypsum binder, where various fillers, fillers and modifiers are introduced:

* gypsum binder (possible addition of lime, Portland cement);
* filler/filler;
- setting retarder;
- water-retaining and / or rheological additive;
- hydrophobizator;

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* defoamer (if necessary);

• air intake (if necessary).

Methods

For the production of gypsum binders [6], natural dihydrate gypsum, anhydrite, clay gypsum, as well as some industrial waste consisting mainly of dihydrate or anhydrous calcium sulfate or a mixture of them (phosphogypsum, borogypsum, citrogypsum, etc.) are used as the main raw materials.

Waste from the production of phosphoric fertilizers and extraction phosphoric acid contains impurities of fluorine, phosphoric acid, sodium, potassium, which pollute the environment. The intensification of agricultural development leads to an even greater increase in the production of phosphorus fertilizers, and, consequently, an increase in phosphogypsum waste. Therefore, solving the problem of recycling these wastes is of great importance for the development of the country's economy and improving the environmental situation in the region [2, 5]. The most promising of the outlined areas of utilization of phosphogypsum should include its processing into phosphogypsum binders, which are suitable for the manufacture of a wide range of construction products, dry building mixes, self-leveling floors, etc. [3, 4].

At cost, gypsum materials based on phosphogypsum binders are about two times cheaper than mixtures obtained from natural gypsum, since their production eliminates the stages of extraction, crushing and grinding of rock, which are the most energy-intensive in the production of gypsum binders.

A. V. Volginskiy suggested gipsokartonnye (GPCs) and gipsoshlakobetona binders (GSCP), which is a mixture of construction or high-strength gypsum cement or slag cement and pozzolanic additive. They are characterized by a rapid increase in strength due to the presence of semi-aqueous gypsum, and the ability to harden in wet conditions like hydraulic cements [6].

Results

To improve the construction and technical properties of composite gypsum-containing materials for construction purposes, various additives modifiers are used, which, depending on the purpose, are divided into:

- modifying additives - regulators of rheological properties;

- modifying additives - regulators of setting and hardening processes;

- modifying additives-structure regulators; modifying additives for special purposes;

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- modifying additives of multifunctional action.

The most significant task in the field of obtaining gypsum-containing composite materials for construction purposes is to increase the durability, weather resistance and durability of products made of gypsum binders. This becomes possible when using mechanical activation, i.e., finer grinding of the initial components or by introducing additives into the composition that increase the water resistance of gypsum. Such additives include Portland cement, active mineral additives, ash, slag, etc.

Based on the results of the analysis of literature sources and patent-information search, it was concluded that for the production of high-performance composite mixtures based on gypsum binders for construction purposes, the most promising are:

- application of mechanical activation of raw materials (gypsum, anhydrite, fillers);

- use of chemical additives to increase the durability, plasticity and workability of solutions based on gypsum-containing materials;

- use for the preparation of gypsum binder of industrial waste-phosphogypsum, natural anhydrite and anhydrite, which is a waste of the ceramic industry;

- selection of rational granulometric and material composition of fine aggregate and filler based on local sands and waste from the stone processing industry. The basic technological scheme for the production of powder inorganic composite materials modified with chemical additives consists of the following sections::

- the site of preparation (fine grinding) of the filler;

- mixing area of components;

- the site of production of finished products;

- the packaging area.

Discussion

In increasing the scientific and technical level of the technology for producing powdered inorganic composite materials, an important place belongs to the grinding process, which has a significant impact on the construction and technical properties of binders and is characterized by a high level (up to 30-40 %) of energy, metal and capital costs from the total costs of their production. The main requirements for the grinding process are a rational grain composition of binders, high energy efficiency and reliability with minimal labor and material costs.

Fine grinding, along with reducing the particle size, is accompanied by a number of physical

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and physico-chemical effects that affect both the efficiency of the process itself and the physical properties of the crushed materials [8-14]. Mechanical activation contributes to an increase in the activity of the crushed material as a result of various kinds of defects, an increase in the number of active centers on the surface of the particles, etc.

Classification of gypsum binders is carried out not only by their strength indicators, but also by the degree of grinding-they are divided into binders of coarse, medium and fine grinding [9-20].

Conclusions

1. Having analyzed the economic, environmental and technological aspects as raw materials for the production of modified inorganic powder composite materials for construction purposes based on local raw materials and industrial waste that meet the requirements of world standards in terms of their indicators (strength, durability, adhesion, atmospheric, water, frost and biostability), to adopt gypsum rocks from different deposits of Uzbekistan, phosphogypsum - waste from the production of extraction phosphoric acid, fillers and aggregates from river and dune sands, limestone and marble chips - waste from the stone processing industry.

2. To improve the construction, technical and rheological properties of the developed powder composite materials based on gypsum and phosphogypsum binders, modifier additives were selected to increase the durability (increase the setting time), improve the rheological properties, water, weather and biostability.

3. The most effective way to obtain a fine powder material consisting of several components is its mechanical activation in a dismembrator, where the material is finely ground in a short time.

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