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POSSIBILITIES OF OBTAINING SPECTACULAR BINDING MATERIAL AT LOW TEMPERATURE.

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ANNOTATION

Experiments have shown that low-temperature calcined decorative sulphoaluminate silicate cement has several advantages over white portland cement and has created possibilities for its use in place of white portland cement.

Key words

white portland cement, sulfominerals, phosphogypsum, phosphoanhydride, calcium sulfosilicate, superphosphate, kaolin, sulfuric acid.

Currently, white portland cement is the main scenic hydraulic binder material. Due to the fact that iron oxide is almost not found in the raw material mixture of this portland cement, it is very difficult to burn it at 1500...1600°C, which complicates the production technology. Therefore, the amount of such cement produced cannot satisfy the demand for it in construction. T.Otaqo'ziev, F.Mirzaev and M.Mirhojiev burned kaolin, limestone and phosphogypsum raw material mixtures to obtain white cement consisting mainly of sulfominerals at low temperature. The mixture was prepared to obtain cement containing 3SaO*3Al2O3*CaSO4 and 2(2CaO*SiO2)*CaSO4 and a slight excess of Sa SO4. This mixture of raw materials was burned in a silt furnace for 60 minutes at 1200...1250° and cooled quickly in the open air. The resulting clinker is light colored and easy to powder.

Experiments show that phosphoanhydride dissociates less in the presence of kaolin and lime under such conditions, because the oxides that allow its disintegration - SiO2 *Al2O3 and Fe2O3 react with lime.

The conducted experiments confirm the possibilities of obtaining white (scenic) sulphoaluminosilicate cement, which has a high level of activity and water resistance, and lime is washed away and does not come to the surface.

The results of the laboratory experiments were tested at the Angren plant, which produces white Portland cement. 14% of kaolin clay, 42% of limestone and 44% of phosphogypsum are the raw materials used in the factory. A mixture of calcium sulfosilicate, sulfoaluminate, and an excess of SaSO, (considering its 30%

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decomposition under production conditions) was prepared with some S4AF formation.

Phosphogypsum, a by-product of the phosphorus fertilizer industry, does not require special funds and operating costs, its dispersion (powder) eliminates the need for grinding, which is considered a necessary process for limestone. This makes it possible to save a lot of electricity, reduce the consumption of grinding bodies, and also solve the problem of using waste.

During the test, the material's firing temperature decreased by 250 degrees and reached 1250 degrees. Despite the fact that the furnace consumption has increased significantly, the mixture of raw materials has been moderate and based on the complete binding of lime. There were no large lumps or other negative conditions. Pre-ripened clinker was yellowish in color, with unpolished grains of various shapes. The clinker did not disperse when quickly cooled in water. Its weight was 1200 g/l. The crushing ability of the obtained clinker was 2 times higher than that of white portland cement.

Thus, as a result of the test, a 25% increase in the productivity of the furnace and a 30% reduction in the relative consumption of fuel oil were achieved. Under the conditions of low temperature firing, the strength of the furnace lining is maintained much longer than in the production of white portland cement.

Physical and mechanical tests of the resulting cement showed that it conformed to UzRST, its flexural strength after 1, 3, 7, 28, 180, and 360 days was 19, 41, 57, 73, and 74 kg/cm², respectively, and its compressive strength was 165 , consisting of 312, 392, 430, 500 and 550 kgk/cm². The average density of the cement mixture is 23.5%. Its whiteness is in the range of 76...81%. The cement hardens without changing its color and does not need expensive hydraulic additives.

Therefore, the conducted experiments showed that decorative sulfoaluminate silicate cement fired at low temperature has several advantages over white portland cement.

The positive results obtained from the conducted research allow us to recommend sulfoaluminate silicate cement with different amounts of 3SaO*3(Al)2 O3 CaSO4 for production in the building materials industry. For this purpose, it is possible to use cerumic kaolinite clays, chemical industry waste (phosphogypsum), which greatly facilitates the production of white cement, which requires high-quality clays.

In addition, it will be possible to grind raw materials and cement, as well as to reduce the energy spent on fuel.

As we mentioned above, at the same time, it was shown that full decomposition at 1450°C in the presence of phosphogypsum reducer to obtain

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portland cement clinker and sulfur gas. In addition, when the technology of obtaining cements consisting of sulfominerals in laboratory and production conditions is determined; secondly, more than 2 million tons of phosphogypsum waste is generated per year at the Almaliq chemical plant alone.

After the reconstruction of the superphosphate plants in Samarkand and Kokon, the amount of waste generated in one year will reach 8 million tons. Thirdly, in 2018, the production of Uzbekistan's cement factories will increase by one and a half times compared to the previous five years. So, the capacity of cement plants of Uzbekistan reaches 8 million tons of phosphogypsum processing. Therefore, the second direction is implemented. Replacing limestone with phosphogypsum and taking sulfuric acid together with sulfomineral cement was solved.

The experiments carried out in the semi-industrial facilities of the laboratory and the Voskresensk Chemical Combine (in which T. A. Otaqo'ziev, F. M. Mirzaev, M. M. Mirhojiev and Z. K. Toirov participated) showed the correctness of this direction. When cement is obtained by this method, due to the dispersion of fuel, especially phosphogypsum, the cost of grinding materials is greatly reduced (which leads to the abandonment of grinding mills that consume a lot of energy). Clay raw materials are consumed very little (8%), and phosphogypsum is consumed in a very large amount (92%) (up to 1.8 t of phosphogypsum is consumed to obtain 1 t of cement). In addition, 70...80% of the consumed sulfur in the form of sulfuric acid is returned and used to decompose phosphorites again. It was also found that additives such as P2O5 and F in phosphogypsum do not have a negative effect on clinker formation and cement properties.

The conducted experiments show that the technology of obtaining sulfomineral cement, which ripens at a low temperature, together with sulfuric acid, has several advantages over other technologies that we have considered.

According to Khomaki's calculations, the Ohangaron cement plant has been able to make a profit of up to 30 million soums a year due to the simultaneous transfer of both sulfomineral cement and sulfuric acid to the plant, crushing raw materials and saving fuel.

Thus, the problem of using phosphogypsum for some purpose, as mentioned above, has been in the focus of attention of foreign scientists for several decades. This problem is being successfully solved by the chemists of our republic and has been put into production in the last 10 years. As a result, most of the demand for fast-hardening, high-strength cement, which is the "bread" of constructions in our Republic, and other good properties, is fully satisfied at the expense of this cheap building material.

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