REFRACTORY ADHESIVES BASED ON SPENT ALUMINA AND CHROMIUM OXIDES

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Phosphoric acid salts (phosphates) are widely used in the national economy due to their binding properties. Various types of heat-resistant and thermally stable materials, anticorrosive and electrically insulating coatings, and highly effective adhesives have been obtained on the basis of phosphate binders. Approaching ceramics in some properties, phosphate materials at the same time have a number of valuable advantages [6-8]. For example, aluminophosphates are the most common materials based on phosphate binders. They are used to obtain effective heat-resistant concretes of various compositions and adhesives for gluing refractory products, as well as many special-purpose materials and products. The widespread use of aluminochromophosphates is explained by their diverse properties acquired depending on the type of the initial filler raw material and the technological parameters of production. This paper discusses the curing processes of heat-resistant adhesives obtained on the basis of Shurtangas waste, aluminum oxide, and reactive chromium oxide.

Phosphate cements occupy a significant place among binders, possessing a number of valuable properties, due to which they have found application in technology as adhesives, heat-resistant and corrosion-resistant coatings, acid-resistant and heat-resistant materials.

In technology, representatives of this class of materials are found under the names of "efractory solutions and mortars" [1], "adhesives – cements", "adhesives – binders" [2,3],

"heat-resistant adhesives" [4], sometimes they talk about "binding system" and adhesive composition" [5]. In essence, these are materials of similar purposes, but with very different physical, chemical and technical properties, and each name to one degree or another emphasizes the technical properties of a particular adhesive.

Therefore, the problem of using industrial waste as a filler in phosphate adhesive systems has become relevant. However, powder components are used as fillers in the production of phosphate adhesive compositions, as a rule, pure oxides and complex compounds, powders of metals, alloys and other compounds, which are scarce and expensive materials.

This limits their raw material base, increases the cost of lining works and ultimately seriously hinders the widespread use of phosphate adhesives in industry. In this regard, the problem of developing new phosphate adhesives based on industrial waste is relevant, in particular on the spent adsorbent of polyethylene production, consisting of refractory aluminum oxide, as well as chromium oxide - waste from tannery production. The use of non-traditional sources of local raw materials allows not only to expand the raw material base, but also solves the problems of industrial waste disposal and environmental protection. At the same time, the presence of this waste is comparable to the average annual consumption of certain types of refractory raw materials imported from abroad, which will allow the widespread introduction of new local refractory glue.

In this regard, the intensification of the technology for the production of building materials associated with the use of high-temperature processes places increased demands on refractories and binders. The destruction of refractory masonry largely occurs not from the failure of refractory products, but from the weakening of the intermediate layer created by hardened refractory solutions. The use of traditional clay-chamotte or cement mortars in the monolithization of enclosing structures of thermal units often does not provide the necessary technical properties both in strength and thermal characteristics, and in the gas tightness of the resulting masonry. In recent years, intensive work has been carried out to create fundamentally new binders and composite materials based on them for use as refractory adhesives (solutions). A promising direction in this area is the use of phosphate binders in refractory adhesives, which have a number of advantages over traditional binders. Phosphate compositions have good adhesive properties, high fire resistance and heat resistance, their hardening and structure formation occurs at normal or moderate (up to 500 °C) temperatures.

Studies of the macrostructure, crystal-optical analysis and electron microscopy have established that the phase composition of phosphate neoplasms in adhesive compositions based on H_3PO_4 and AXFC (aluminochromophosphate) is similar, only AXFC compositions

contain more glass phase. After heat treatment at 300 °C, the crystalline part of the phase composition is represented by $Al(PO_3)$ in forms B and A, $AlH_3(PO_4)_2$, nH_2O, $AlPO_4 \bullet H_2O$, $AlPO_4$ – berlinite. After heat treatment at 1100 °C, only crystals of $AlPO_4$ of the rhombic modification and a mixture of phosphocristobalite and phosphotridimite were found; in the compositions on AXFC, the presence of α - $CrPO_4$ is possible. Electron microscopic studies have shown that at low temperatures, amorphous neoplasms predominate in the glue on AXFC, and crystalline compounds in the composition of H_3PO_4. With an increase in temperature, crystallization intensifies, however, in the compositions on AXFC after heat treatment at 1100 °C, a significant amount of glass phase remains, which can explain their higher strength.

Literature

1. Kopeykin V.A., Klimenteva V.S., Krasniy B.L. Ogneupornie rastvori na fosfatnix svyazuyushix [Fire-resistant solutions based on phosphatic compounds]. – M.: Metallurgiya, 1986, Pp: 104.
2. Sichyov M.M. Neorganicheskie klei [Inorganic adhesives]. – L.: Ximiya, 1986. Pp: 153.
3. Kopeykin V.A., Petrova A.P., Rashkovan I.L. Materiali na osnove metallofosfatov [Materials based on metal phosphates]. M.: Ximiya, 1976. Pp: 200.
4. Petrova A.P. Termostoykie klei [Heat resistant adhesives]. – M.: Ximiya, 1977. – 200 s.: il.
5. Sichyov M.M. Neorganicheskie klei [Inorganic adhesives]. – L.: Ximiya, 1974. Pp: 160.