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MODERN STATE FOR MAKING OF НИЗКОПЛОТНЫХ CARBON MATERIALS

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The methods of making of carbon-graphite materials and carbon composites of low density with the high level of operating parameters are considered. It is shown that on forming of structure for high-porous materials basic influence is rendered content and grain-size distribution of porous-forming, including its chemical nature, size of factions and form of particles of filler, conditions of its preliminary thermal treatment, correlation «filler-connective», and also type of connective, method of shaping of billet and technological parameters of process.

Keywords: carbon-graphite low-density materials, carbon low-density composites, methods of making, there defects

Low compact high temperature materials have the special value in a modern technique, as characterized by the high level of operating parameters, including. by a subzero density and subzero heat conductivity, providing possibility of their using for high temperatures.

High-porous carbon-graphite materials get pressing of press-powder with connective material with addition of pore agenteй with the subsequent burning and графитацией.

Explaining to the large variety of physical properties of different types of carbon matters lies in a size and gourmet of separate crystals, and also in specificity of the most crystalline structure of graphite [1].

Presently carbon-graphite materials are widely used for making of different vehicles and machines for chemical industry; they serve as construction materials, when their valuable corrosion and heat-conducting resistances are used.

All types of carbon-graphite materials are well durable enough, Due to combination of chemical stability with good heat conductivity, a graphite is irreplaceable for a heat-exchange apparatus and aggressive liquids.

The connective material , being low-viscosity and easily soluble products, called thermosets, or oligomers, have a most value in the production of composition construction plastics and to be able to grow into the polymer of the reticulated structure under the action of warmth, hardening agent, catalysts or initiators of hot-setting [2]. At the hardening of connective material in the process of forming product its form is irreversibly fixed. Choice hardening connective material for composition materials is an extraordinarily important and difficult task the correct decision of which assists creation of material with optimal technological and operating properties.

There are a few methods of giving to materials of porous structure. So, for forming of structure of metallic foam materials, and also at making of ceramic porous refractory use three methods [3]:

- introduction and subsequent moving away of filler;
- adding to the suspension of foam agent or separately prepared foams;
- gasification with the use of chemical reactions.

The transferred methods of creation of high-porous materials have a row of defects. A method of introduction and moving away of filler is labour intensive, the got products have a higher relative density and less strength, than products, got by foam method. The foam method requires the protracted period of drying for billets, besides process of making of foams from metals by a density higher than $5{,}7 \cdot 10^3$ kg/m^3 are very difficult.

One of widespread methods of making of high-porous materials is introduction and subsequent carbonating of additions [4]. In materials, got by such method, porosity (mainly open) is 55-60 %. As carbonyl additions use mainly littlish poly fractional organic matters: powdery wood, hydrocarbons, and also petroleum coke and granular poly styrene marbles. A carbon remains forms during carbonating additions.

On forming of structure of high-porous carbon-graphite materials basic influence is rendered by content and grain-size distribution of pore agent, including its chemical nature, size of narrow factions and form of particles of filler, conditions of its thermal treatment, correlation "наполнитель: connective material, and also type of connective material, method of forming of billet and technological parameters of process [5].

To the number basic factors, influencing on forming of porous structure in carbon materials, take: correlation between filler and connective material in press-powder; nature of filler and connective material; distribution connective material between particles at mixing and pressing; grain-size distribution of filler; pressure of pressing; kind and quantity of porous containing additions; temperature and duration of burning; presence of additional impregnations with the subsequent burning; temperature of graphitation.

Sizes of pores in graphite it is possible to change due to a form and sizes of porous containing additions at identical percent correlation them in a charge. It is thus succeeded to get materials with identical total porosity, but with the different sizes of pores.

The fibred systems with a chaotic structure widely apply as heat-insulation and construction materials. On the basis of vegetable, synthetic and glass fibres effective heat-insulation materials are worked out for subzero and moderate temperatures (232.723 K). At more high temperatures use mineral cotton wool, asbestos and basaltic fibre (to 1273 K), graphite fibre, felting and wire juble from heat-resistant metals - tungsten, molybdenum (to 2773 K).

In construction materials fibres serve as power carcass, providing high properties of strength and possibility of deformations in the required direction.

The last years new composition materials are worked out on the basis of the wattled fibres from electricity-conductive materials (fabrics with nichrome, fabrics

from a graphitizing viscose), used as flexible heat-generating elements. Flexible heat-generating elements are applied at development of the special thermal defense of thermostatic devices and heaters.

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