Рис.4 – Результати активного трифазного випрямляча
а – форма вхідного струму та вхідної напруги;
в – форма вихідної напруги

Отже, проведене моделювання показало важливу можливість забезпечення синусоїдальної форми вхідного струму з нульовим зрушенням по фазі з напругою живлення, що обумовлює коефіцієнт потужності близький до одиниці. Це означає, що в даному режимі електровоз змінного струму з мережі живлення не споживатиме реактивної потужності, що відповідно зменшить фінансові витрати електроенергії на реактивну потужність.

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INCREASING ABRASIVE AND THERMAL RESISTANCE OF CORUNDUM-GRAPHITE MATERIALS

Refractory materials with properties such as mechanical strength, high erosion and corrosion resistance, and heat resistance are of practical interest. An increase in the quality characteristics of heat-resistant materials is observed simultaneously with a decrease in their volume of consumption through the introduction of new advanced technologies [1, 2].

The development of methods for protecting carbon from oxidation is one of the most important methods for improving graphite-containing composites, which is achieved by adding oxygen-free refractory compounds, metals, and other materials. The number and nature of new formations, as well as the resulting synthesized secondary phases formed at the boundaries and in the intergranular space, as well as along the surface of grains, have a strong influence on the oxidation resistance of a heat-resistant material. At the same time, additives should, if possible, perform several technological tasks such as increasing the density of the sintered material, the plasticity of the molded mass and reducing the lower temperature limit of the sintering range of the mass. Such loads obviously lead to a decrease in the access of oxygen to the surface of graphite flakes and the oxidation of the refractory as a whole [3, 4].

Increasing abrasive and thermal resistance of corundum-graphite products is achieved by introducing silicon carbide into the charge. Moreover, the protective membrane that it creates during oxidation can prevent the process of graphite burning out in the future [5].

In Fig. 1 shows a method of semi-dry pressing of corundum-graphite materials using modified silicon alkoxide hydrolyzers as a binder.

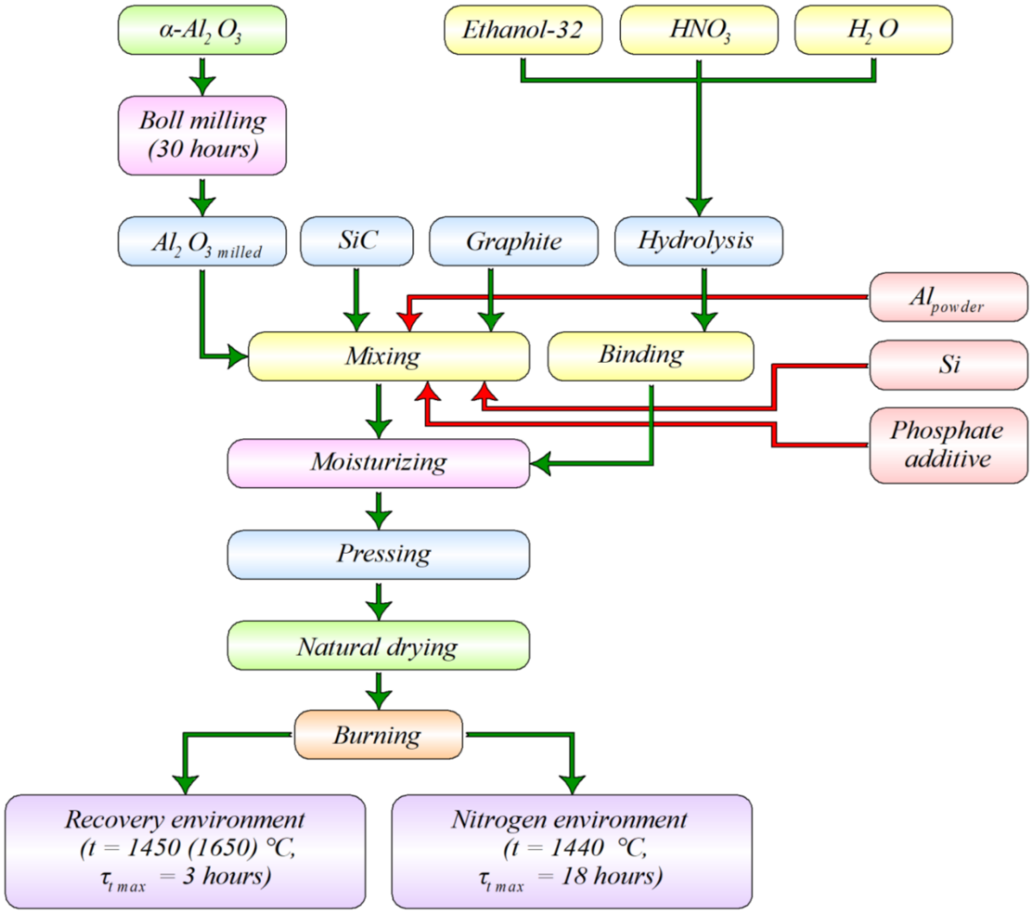

Fig. 1. Technological scheme for the production of corundum-graphite materials

The degree of oxidation of graphite was assessed by the weight loss of the samples after heat treatment at 800 °C for 4 hours. The value of the inhibition coefficient was calculated based on the data obtained, where a composition with a silicon carbide content of 5 wt.%. The change in flexural strength of heat-treated materials was studied along with the evaluation of the degree of burnout of graphite.

X-ray diffraction and petrographic analysis of the developed corundum-graphite SiC-containing refractories was carried out after their isothermal exposure at 800 °C for 4 hours. The influence of the type of antioxidant additive on the amount of mass loss when heated to 1000 °C of modified corundum-graphite silicon carbide-containing materials obtained on the basis of the developed base Al_2O_3–SiC–C compositions were studied by differential thermal analysis.

Silicon carbide introduced into the composition of the masses provides oxidation resistance and high erosion resistance, acting as an antioxidant. The use of modified ethyl silicate binders, which wet graphite well, impart strength to the raw material, limit the oxidation of graphite and are a source of amorphous SiO_2, which is able to interact with α–Al_2O_3 to form mullite.

The introduction of an optimal or minimum amount of finely dispersed silicon carbide not only protects graphite from burnout, but also selectively improves the properties of products, in particular, compressive strength and density.

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APPLICATION OF ARTIFICIAL INTELLIGENCE IN THE TRANSPORT INDUSTRY

The practical application of artificial intelligence methods in engineering, despite the actual successes achieved and the many practical projects being implemented in the transport industry, is from a historical point of view at the initial stage, primarily if assessed based on the degree of realization of its potential [1, 2].