

**PERICLASE-CARBON MATERIALS
OF THE RAISED STABILITY TO OXIDATION**

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The addition of carbon to refractories increases thermal conductivity, resistance to crack propagation, heat resistance and resistance to the aggressive effects of slag. However, there are two main disadvantages when introducing carbon into refractories: low mechanical strength and the high tendency of carbon to oxidize at high temperatures.

An alternative control for carbon oxidation in a refractory is to coat the surface of the carbon particles with protective layers of specific oxides (Al_2O_3 , SiO_2 , TiO_2 and ZrO_2 , NiO) or carbides (SiC). Selected oxides, in the presence of carbon, serve as electron donors and transfer electrons to the carbon phase, creating stable electron propagation, and thereby retard carbon oxidation.

Coated graphite has better corrosion resistance, however research shows that this effect is limited at higher temperatures and specific boundary conditions. In addition, weak adhesion between the carbon and the coating layer results in low strength and low resistance to crack propagation.

Another effective way to prevent the carbon of refractories from oxidizing when heated is to use antioxidants. Antioxidants react with the carbon phase and thereby help reduce the rate of carbon oxidation. Some of the products formed after the interaction of the carbon phase with the antioxidant exhibit volumetric expansion. The porosity of carbon-containing refractories decreases. The penetration and diffusion of oxygen into the refractory is slowed down.

The ideal solution would be to combine additives that effectively protect graphite from oxidation at low and elevated temperatures.

Thus, in this work, aluminum was introduced as an antioxidant for the production of periclase-carbon refractories with increased resistance to oxidation, and additionally solutions of nickel salts and sols based on them were introduced. Nickel salts are introduced to form active antioxidants – the formation of a NiO coating on graphite.

Compositions of masses of periclase-carbon refractories with increased resistance to oxidation have been developed. It has been established that the developed compositions of the masses, in terms of their porosity and slag resistance, can be recommended for use in creating linings for steel-pouring ladles.