



NATIONAL METALLURGICAL ACADEMY OF UKRAINE

INNOVATIVE TECHNOLOGY OF BORON CARBIDE PRODUCTION AND WURTZITELIKE AND GRAPHITELIKE BORON NITRIDE PRODUCTION

Boron carbide, obtaining the complex of chemical, physical and mechanical properties, finds wide application in a modern technic, being very extra-hard material (it is on the third place among the known abrasive materials) it is irreplaceable in nuclear power at the production of bars, it is used as blend component at the steel production, it shows extremely chemical stability in different corrosive mediums.



Technology of high quality boron carbide production is developed, which includes:

- new construction of furnace, which provides production of block of any necessary mass;
- device allowing to put the block of boron carbide from the furnace without taking off furnace mantle;
- technological parameters of

preparation of charge components to melting;

- electric parameters of the process, which provide the optimal concentration of electric energy in a reactionary volume;

- produced boron carbide as commodity faction or abrasive powders contains:

B_4C	B_{total}	C_{total}	C_{free}	B_2O_3	Si	Fe	N
96,0	78	21	1,0	1,0	0,3	0,5	0,5

Boron nitride is polymorphic compound. Three modifications of boron nitride, which get industrial application, are known: hexagonal graphitesimilar BN, hexagonal wurtzitesimilar BN, and cubic blendesimilar BN. All modifications possess unique

properties and are used in various branches of industries. Boron nitride is a good dielectric, heat insulator, non toxic material and it is inert to the majority melted



metals and slag. However its main application is super-hard material synthesis: borazon, cubic and wurtzite-like boron nitrides.

New technology of boron nitride synthesis using the new two-stage urea method is developed and this technology includes:

- new machine design;
- provides the stable receipt of boron nitride composition, %:

Boron nitride	98,0-98,9
Boron oxide, B_2O_3	0,2-0,3
Iron	0,02-0,1
Wurtzitesimilar BN	95,5-96,1
Graphitesimilar BN	2,0-2,5
Specific surface	$7 \text{ m}^2/\text{g}$.