Секція
ФУНКЦІОНАЛЬНІ МАТЕРІАЛИ ТА ТЕХНОЛОГІЇ ПРИ ВИГОТОВЛЕННІ ТА ВІДНОВЛЕННІ ДЕТАЛЕЙ ТРАНСПОРТНОГО ПРИЗНАЧЕННЯ

UDC 620.22.66.062.124

PECULARITY RECEIVING OF INSTRUMENTAL MATERIALS ULTRADISPERSED MIXES Al_2O_3 WITH ADDED NANOPOWDER SiC

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The basis of numerous types of tool ceramics is aluminum oxide [1, 2]. Along with the advantages (high hardness, especially at elevated temperatures, chemical inertness and, accordingly, high wear resistance, unlimited raw materials), oxide ceramics have a number of disadvantages: high brittleness, low resistance to thermal and mechanical shocks. Despite this, materials based on aluminum oxide have found application as a cutting tool for processing high-hard metal alloys and other difficult-to-cut materials [3, 4].

Aluminum oxide sintering is a well-studied process. It occurs under the influence of the following mass transfer mechanisms: viscous flow, plastic deformation, evaporation-condensation, volumetric, grain boundary and surface diffusion. In hot pressing, as a rule, the main mechanisms of compaction of ceramics at the final stage are plastic deformation and diffusion.

The structure of tool ceramics has the following properties: high density of the material, strength of interfacial and grain boundaries, high dispersion and uniform distribution of structural components, the minimum size of defects that can serve as a source of destruction, the absence of fusible components that reduce high-temperature strength, high hardness and resistance to crack propagation. The mechanical characteristics of oxide ceramics are directly related to the average grain size in the material [5].

The conducted studies have shown that in order to obtain Al_2O_3–SiC cutting inserts with high functionality, it is necessary to optimize the ratio of the phase components of the initial powders and their homogenization during mixing, to mold by hot vacuum pressing by direct transmission of high electric current.

The quality of tool materials intended for blade processing is very significantly affected by the processing of the edges of the plates: grinding and finishing, processing of working chamfers and rounding radii. The use of nanodispersed powders makes it possible to obtain plates with a radius of curvature of 0.5...0.8 mm,

which improves the quality of the treated surface layer and reduces surface roughness.

An important issue of research remains the optimization of cutting parameters when turning various metals and alloys, the search for the most effective area of the developed tool materials. Given the wide range of hard-to-cut, high-hard alloys, in order to determine the optimal field of application of blade tool material, it is advisable to test tool cutting inserts using an accelerated method. To do this, there are a number of techniques for blade tools.

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УДК 621.763

ДОСЛІДЖЕННЯ ФОРМУВАННЯ І СПІКАННЯ СИНТЕЗОВАНИХ ПОРОШКІВ ZRO_2 З ФТОРИДНИХ РОЗЧИНІВ

STUDY OF FORMATION AND SINTERING OF SYNTHESIZED ZRO_2 POWDERS FROM FLUORIDE SOLUTIONS

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