

ABSTRACT

The work contains 121 pages, 60 figures, 14 tables, 73 references.

The object of research the cermet composite materials B_4C-TiB_2-Al and B_4C-TiB_2-Cu obtained by cladding powder.

The aim is to obtain, study the structure and properties of cermet composites of the systems B_4C-TiB_2-Al and B_4C-TiB_2-Cu .

Methods and apparatus: cladding of powders was carried out at the installation ANGA-1, obtaining composite materials by spark-plasma sintering at the installation FCT-25 (Germany), the microstructure of materials was research on an optical microscope "NEOPHOT - 21" and electronic microscope Selmi PЭM-106И, research hardness on the appliance MHV-1000, X-ray recording was conducted diffractometer in the presence of selectively-absorbing filter.

The metal-ceramic composites of the systems B_4C-TiB_2-Al and B_4C-TiB_2-Cu were obtained by ion-plasma cladding (Al and Cu) powder B_4C-TiB_2 , and subsequent spark-plasma sintering. Research microstructure showed that they represent polycrystalline materials consisting of multidirectional eutectic grains by a delineated layer, respectively, of phases based on aluminum and copper. Research micromechanical properties showed that the hardness obtained composite achieves 33,6 GPa (for composite B_4C-TiB_2-Al) and fracture toughness $5,4 \text{ MPa}\cdot\text{m}^{1/2}$ (for composite B_4C-TiB_2-Al). Thus, they are promising for further study as wear-resistant materials.

Keywords: CLADDING OF POWDER, EUTECTIC POWDER, SPARK-PLASMA SINTERING, BORON CARBIDE, TITANIUM DIBORIDE, ALUMINUM, COPPER.