

METALLIZATION OF THE SURFACE OF B₄C CERAMICS BY COMBINED ELECTRON-ION-PLASMA METHOD

ZULFA BIKBAEVA¹, YURI F. IVANOV² AND OLEG L. KHASANOV¹

¹*National Research Tomsk Polytechnic University*

²*Institute of High Current Electronics SB RAS, Russia*
khasanov@tpu.ru

The «film (Ti) / (B₄C ceramics) substrate» system and «film (Cu) / (B₄C ceramics) substrate» was investigated after irradiation by an intense pulse electron beam.

On the polished surface of the samples a titanium or copper film with thickness of 0.5 μm was sputtered. Formation of the film was carried out on the modernized installation of ion-plasma sputtering «Quinta». The treatment of the film/substrate system by an electron beam was carried out with the «SOLO»: energy of the accelerated electrons was 16 keV, energy density of the electron beam made 17 J/cm², time between pulses made 0.3 s⁻¹, number of pulses was 3, pulse duration made 200 μs, residual atmosphere pressure (argon) in the working chamber ≈ 2 × 10⁻² Pa. Just before irradiation the film/substrate system was heated by the electron beam up to temperature of (800–850) °C.

It was found that the multiphase structure crystallized on the eutectic reaction was formed in the surface layer of the film/substrate system.

Spraying on the surface of titanium boron carbide ceramic layer (0.5 mm) and its subsequent irradiation of intense pulsed electron beam results in the formation of titanium diboride surface layer.

Irradiation intense pulsed electron beam System «film (Ti) / (B₄C-ceramic) substrate» leads to the formation of a surface layer (5–7) microns multiphase eutectic structure consisting of crystallites of boron carbide, titanium diboride and titanium.

Formation of new phases in the «film (Cu) / (B₄C ceramics) substrate» is not found.

Keywords: *ceramics, metallization, intense electron beam.*