CONCLUSIONS

Thus, as a result of this work, the structure of TiN coatings on a solid VC alloy was investigated.

The metallographic analysis found that the microstructure of the resulting coatings is a matrix in which the TiN grains are located and the droplet phase. As the time of spraying increases, the amount of the droplet phase decreases.

Having analyzed the data obtained by linear analysis of microstructure images, we came to the conclusion that with the increase in the time of application, the size of the grains and the droplet phase decreases; this is due to an increase in the surface temperature, resulting in the formation of secondary embryos.

Experimental studies of mechanical characteristics have shown that the integral microhardness of the TiN coating varies with the change in spray time and reaches hardness that corresponds to TiN hardness at a thickness of 5 microns or more.

Therefore, to obtain optimal values of mechanical characteristics, it is necessary to change the time of spraying so that the droplet phase disappears and a more qualitative alloy is formed.

When the arc current is increased, the size of the droplet phase increases, due to an increase in the current on the cathode, conditions are created for knocking out, not single atoms, and their groups. The grain size decreases with increasing arc current.

The integral microhardness of the TiN coating is increased by changing the arc current. An increase in hardness may be due to a decrease in the size of TiN grains, and a reduction in the grain size increases hardness and reduces cracking resistance.

Therefore, to obtain optimal values of mechanical characteristics, it is necessary to change the arc current in such a way that the droplet phase and crack resistance are minimal and the microhardness is high.

With increasing pressure in the spray chamber, the grain size is reduced due to excess nitrogen, which leads to an increase in the crystallization centers. Increasing the pressure in the spray chamber does not affect the droplet phase and hardness, but crack resistance decreases by reducing the size of the grain.

Therefore, to obtain the optimal values of mechanical characteristics, it is necessary to change the pressure in the spray chamber so that the grain size is minimal. The optimum spray modes are spray at (I = 100A; P = 7.998 Pa; t = 10 min).