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FORMATION OF A BORON-BASED PROTECTIVE COATING ON THE SURFACE OF D2 DIE STEEL BY ELECTRON BEAM PROCESSING*

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To improve the performance properties of steels of various grades, various methods of surface treatment of the material are used. Boriding technology occupies not the last place among the common methods. The essence of the technology is to saturate the surface layer of the metal with boron and iron compounds FeB and Fe2B. When boriding by the traditional method, hard boride layers are obtained, but along with high hardness, borides are quite brittle and prone to chipping. In this work to reduce the brittleness of the layers, we studied the saturation of the D2 steel surface with boron under the action of continuous electron beams in vacuum. We have considered the effect of alloying elements on FeB and Fe_2B boride layers.

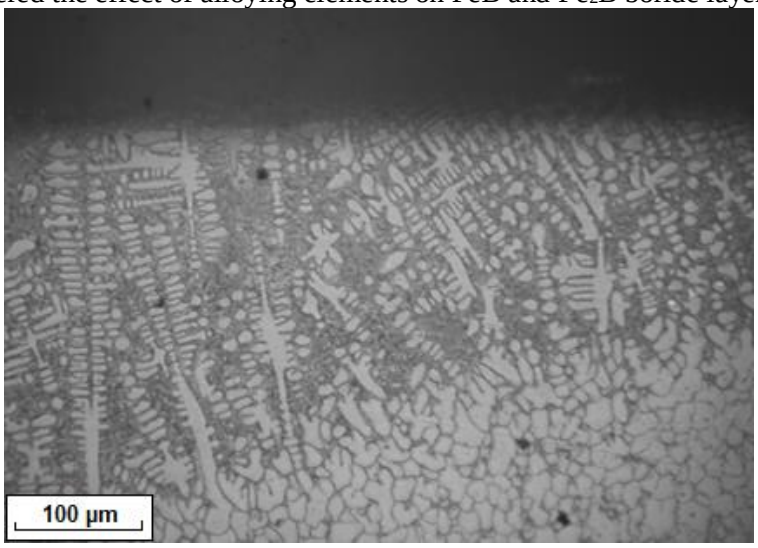

Fig. 1. Boride layer on D2 steel

We investigated the microstructure (Fig. 1) and microhardness (Fig. 2) of the obtained layers. The hardness of D2 steel is 256 HV. The hardness of the boride layer reaches up to 900 HV, and the hardness of the base up to 400 HV. From this we can conclude that the steel itself is hardened by an electron beam.

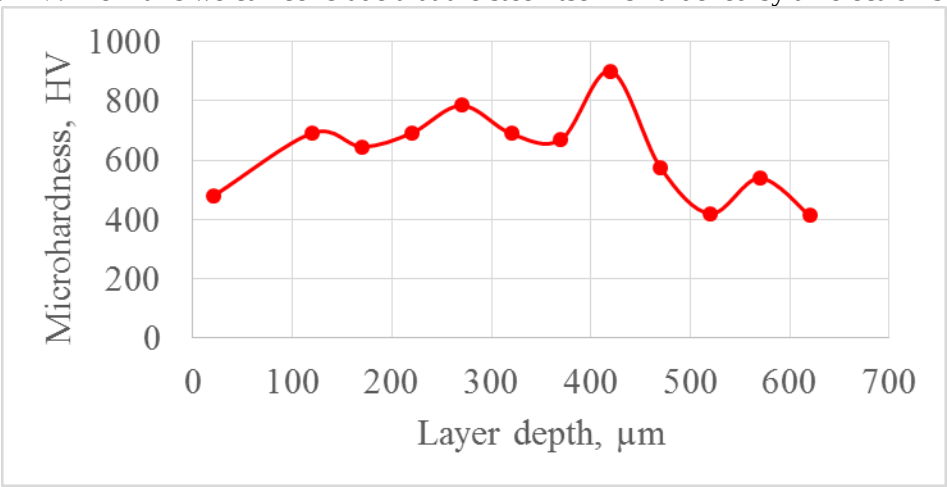

Fig. 2. Microhardness of the boride layer on D2 steel

The results obtained give us the opportunity to consider the use of electron beam boriding of die tool steels in production.

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