THE STUDIES OF CARBIDES FORMED DURING TEMPERING OF 217H12WF/D3 TOOL STEEL AFTER AUSTENITIZING

STUDIE KARBIDŮ FORMOVANÝCH BĚHEM TEMPEROVÁNÍ NÁSTROJOVÉ OCELI 217H12WF/D3 PO AUSTENITIZACI

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The basic aim of this work was to establish the changes occurring in the tool steel concerning carbides, their formations and transformations, during tempering the steel under different temperatures after its austenitizing. The studies were carried out on steel of type 217H12WF/AISI D3 hardened after austenitizing at 1050 °C during 30 minutes and tempering at the temperatures from 200 °C up to 700 °C. It is known that in the steel hardened after austenitizing at 1050 °C the process of carbides precipitation during tempering in the temperature range of 400-700 °C is distinctly higher than in temperatures up to 400 °C. The identification studies of carbides were carried out by the method of electron diffraction from the extraction carbides replicas. Based on the diffraction studies performed from the extraction replicas, using electron microscopy, it was found that after 120-min tempering in the consecutive temperatures, the following types of carbides occur: 200 °C ® e + c + Fe₃C, 350 °C ® e + c + Fe₃C, 500 °C ® c + M₃C + M₇C₃, 600 °C ® c + M₃C + M₇C₃, 700 °C ® M₃C + M₇C₃. Apart from the higher mentioned carbides, there are also big primary carbides and fine secondary ones M₇C₃ occurring, which have not been dissolved during austenitizing. Results of the studies are to be helpful in solving the problems concerning adhesion and life of super-hard layers coated over the working surface of tools made of this type of steel, in these also technological problems.

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