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Investigation of the Effect of Adding the Chemical Elements Nickel, Silicon, Cobalt on the Thermodynamic Properties of Plates Made of Cutting Ceramics

Abstract: The following effects have been found: the effect of adding extra silicon (up to 3%) into the composition of plates made of mixed cutting ceramics of the OAK60KTT40 grade on the rate of isothermal decomposition of supercooled austenite in the perlite and intermediate temperature ranges; and the effect of adding extra chromium (up to 3%) into the composition of plates made of mixed cutting ceramics of the OAK60KTT40 grade containing 20% C on decomposition of austenite in intermediate temperature range; as well as the effect of manganese on decomposition of austenite in the intermediate temperature range in plates of mixed ceramics of the grade OAK60KTT40 containing up to 20% C. As a result of the research, the relative thermodynamic effect of the stability of phases and α alloying elements has been revealed, since the latter have almost no effect on the crystallization parameters of cementite. This means that elements, which do not form carbides, should affect on the rate of austenite decomposition in the intermediate temperature range the same way as on the rate of polymorphic transformation of the plates made of the cutting ceramics that is confirmed when adding extra alloying elements of nickel, cobalt, etc. into the plate composition.