

Fe-C-V alloys with precipitates of spheroidal vanadium carbides VC

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The paper presents the results of tests on the spheroidising treatment of vanadium carbides VC done with magnesium master alloy and RE. The conducted metallographic studies have shown that introducing the magnesium master alloy to an Fe-C-V system of eutectic composition causes the crystallisation of spheroidal carbides. The content of these carbides is about 5.6%, representing 33% of all the crystallised vanadium carbides. Adding RE to the base alloy melt caused 31% of the vanadium carbides crystallise as dendrites. Testing of mechanical properties has proved that the spheroidising treatment of VC carbides in high-vanadium cast iron increases the tensile strength by about 60% and elongation 14 - 21 times, depending on the type of the spheroidising agent used. Tribological studies have shown that high-vanadium cast iron with eutectic, dendritic and spheroidal carbides has the abrasive wear resistance more than twice as high as the abrasion-resistant cast steel.

Keywords: Fe-C-V alloy, eutectic, vanadium carbide, spheroidisation, mechanical properties, wear resistance.

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