EXPERIMENTAL AND THEORETICAL STUDY OF SURFACE PHENOMENA IN THE PROCESS OF INTERACTION BETWEEN THE LOW-PRESSURE HYDROCARBONIC ATMOSPHERES AND FERROALLOYS

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Abstract

We have conducted an experimental study of the interaction between the iron previouslysaturated with carbon and low-pressure atmospheres. The effect of the carbon reverse mass-transfer from the ferro-alloy into the medium conforming to the passive stage of the vacuum carburizing technological process was estimated numerically. The reverse mass-transfer poorly depends on the working chambercapacity, and at a temperature of 940 ℃ it equals 0,42×10^{-5}, which amounts about 0,6 from the directmass-transfer coefficient with the active carbonization. Decarburization mostly depends on the composition of the furnace atmosphere. Determining the precise value of this coefficient gives an opportunity to increase the computational accuracy of the carbon concentration-response curves at two-stage and cyclic duties of vacuum carburizing. The results obtained with account of previously published data open up an opportunity to create aphysical model for saturating iron and its alloys of various compositions in hydrocarbonicmedia and for control quality improvement.

Keywords

Thermochemical treatment, carbonization, diffusion, low-pressure atmospheres, decarburization, atomistic modeling

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