

Potentiostatic study of the pitting alloy steels

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Abstract

The pitting low-alloyed steels with a chromium content of from 1 to 5% (wt.) was studied using the potentiostatic polarization method. The method consists is in the potentiostatic polarization of the samples in the potential unstable sol-rhenium (active-passive transition), followed by an analysis of the current time of oscillation by using Fourier analysis. Analyzing thus periodic oscillation process were determined characteristic frequencies corresponding to the different periods of development of the pitting process, and the interrelation of current oscillations in the experimental chrono-amperogramms with development of the pittings. Based on the identified characteristics of temporal distribution of the characteristic frequencies it was shown that the pitting process can be represented as consisting of three main phases: the formation of an oxide film, its growth that accompanied by the formation of local pockets of dissolution and the development of individual pittings. Moreover, the etching of the pitting's process also has periodic nature.