Acoustic emission model for determination of delamination stages in bimetallic compositions

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In the paper a model of quantitative estimation by AE method of delamination stages in bimetal metals "the base metal - the welded coating" influenced by hydrogen of high concentration is proposed. A model is based on the theoretical AE - model of volume damaging in solids earlier proposed by the authors. Experimental researches have shown that delamination of the specified bimetals can be divided into the following periods:
. the incubation period, when continuous AE of low and average amplitudes is generated and also occasionally occurs discrete low amplitude AE;
. the period of macro-crack propagation and delamination of welded coating. This period is characterized by continuous and discrete AE of low and average amplitudes, which gradually transform into discrete ones of high amplitudes, alternating with low amplitude both discrete and continuous;
. the final period of failure, when decaying of micro - and macro crack formation and welded coating delamination occurs. This period characterizes by alternation of continuous AE of low amplitude and discrete AE of low, average and high amplitudes.
The verification of a model is carried out on bimetallic compositions. Firstly, bimetal composition from the petroleum hydrogenation reactor wall (the base metal was steel 15X2MFA and welded coating was the electrode strip of 07X25M13 + 04X20M10G2B) was investigated. In the second case the base metal was steel 10X2GMA and welded coating was the electrode strip made of 04X20M10G2B steel. For the first bimetallic composition volume damaging was x =16x810-3 and for the second x =970x10-3 cm-1.

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