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IDENTIFICATION OF ACOUSTIC EMISSION SOURCES IN A POLYMER COMPOSITE MATERIAL UNDER CYCLE TENSION LOADING

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Abstract. The paper is devoted to identification damages which developing in the polymer composite material (PCM) structure during fatigue tests, based on the frequency components of the recorded acoustic emission (AE) signals. The objects of the study were specimens made of DION 9300 FR binder and 46 layers of T11-GVS9 fiberglass fabric. Mechanical tests were cyclic tension with AE recording. Fourier spectra for AE signals were calculated and used for the self-organizing Kohonen map (SOM) at the first stage of clustering. At the second stage, a k-means algorithm was used to find clusters with similar centroids and combine them. For the clusters obtained, their nature was determined from the peak frequencies and the periods of their critical accumulation were calculated. Additionally, the peak frequencies analysis of the wavelet decomposition levels was done.

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