

## **Acoustic Emission Phenomena in Composite Materials**

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Studying the strength properties of composite materials is connected to the research of micro mechanisms of the destruction of structural elements, resulting in the growth of defects and the destruction of a material. The most convenient material for such research are fibrous composites. Strength properties of such materials depend basically on the properties of the matrix, reinforcing fibres and the properties of the border separating the fibre and matrix. Usually the elastic module of the reinforced fibres is much higher than the module of elasticity of the matrix. Therefore at deformation of a fibrous composite material, destruction starts from the fibres of high module, owing to the occurrence of kind of pressure shift between a matrix and a fibre. It results in the occurrence of a cross micro crack in the matrix and to further high speed growth of this crack, bringing to full destruction of the material. Micro mechanisms of the destructions of composite materials are investigated by many methods. However, not all techniques give sufficiently full information concerning internal changes occurring in materials. In the present work, some results of studying the micro mechanisms of destruction of a carbon fibrous composite material (CFRP) by a method of acoustic emission (AE) are presented. Basically model samples consisting of an epoxy matrix of low module filled by the high module carbon tape consisting of tens of bunches of fibres were used. Thus in the present work, a kinetic accumulation of signals of acoustic issue (AE) is shown, and micro-mechanisms of destruction of a model fibrous composite material are investigated. On the basis of these researches, methods of increasing of the physical and mechanical properties of a composite are offered. We hope that the results obtained can make a small contribution to studying the structural changes in a composite, and to the creation of new materials with the given properties.