Mechanical Properties of Polymeric Composite Based on Aluminium Microparticles

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The paper deals with the testing of composite materials based on aluminium microparticles. The aim of the research was to determine the influence of content of aluminium microparticle filler on the mechanical properties of the polymeric particle composite. The object of the experiments was a particle polymer composite, whose continuous phase was in the form of a two component epoxy resin and a discontinuous phase (reinforcing particles) of aluminium microparticles, which size was less than 45 μm. The influence of a tensile stress, an impact strength and a wear was experimentally investigated. Composite systems with a higher content of microparticles of aluminium from 15 to 25 volume % achieve higher values of the tensile strength at higher temperatures of environment than the composite systems with a lower content of the aluminium microparticles (or matrix). Due to the increased temperature of the environment there is a significant decrease in tensile strength. Impact strength showed increased values in composite systems that have a higher percentage of aluminium microparticles. The filler in the form of aluminium microparticles is detrimental to wear resistance. The results show that increasing the concentration of microparticles of aluminium increases the mass losses of the test materials.

Keywords: Al filler, impact strength, temperature, two-component epoxy adhesives, wear

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