Nanophysics and physical-chemical materials science

The effect of modification of graphite on strength characteristics of graphite-based PTFE

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The article considers composite materials based on PTFE F4 filled with thermally expanded silver graphite. Nowadays the world is experiencing a dramatical increase in the demand for heat-resistant polymer composite materials (PCM) possessing high-performance properties alongside with the small specific weight, that have found serial use within the most responsible technical branches, such as the air-, machine engineering, ship- and rocket-building, i.e. the branches with special requirements to the product, including maximum strength, hardness, reliability, durability when working in the heavy conditions of loading, at high temperatures and aggressive environments [1,2]. Thanks to chemical inertia towards virtually all the aggressive environments, with the exception of melts of alkali metals and trifluoride chlorine, PTFE F4 is the indispensable material for manufacturing the details of chemical equipment. The lowest friction coefficient of PTFE F4 and compositions based on it among all the other structural materials determines their wide use in mechanical engineering - in friction knots of mechanisms as bearings and support slips, mobile seals - piston rings, bands, that enhances the reliability and durability of machines and devices' mechanisms, providing their work under conditions of aggressive environments and cryogenic temperatures [3].

The influence of the content of thermally expanded and silvery graphite on the physico-mechanical characteristics of graphite plastics based on PTFE F4 is studied. The tests showed that the developed composites exceed the initial polymer modulus of elasticity of 1.9, the Poisson's ratio is 1.8. That allows them to be used for mobile connections of machines and mechanisms, as well as for critical parts.

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2. *Bondaletova L.I.* Polymeric composite materials, P. I: Training. Allowance - Tomsk: Izd. In the Tomsk Polytechnic University, 2013. - 118 p.
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