Nanocomposites and nanomaterials

Wear resistant superhydrophobic coatings

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The theoretical basis of superhydrophobic surfaces production is sufficiently developed at the present time. The majority of current scientific works is concentrated on the task of obtaining superhydrophobic surfaces on different materials base. However, the main problems that limit the successful transfer of this object from pure science to technology: complicated preparation procedures and insufficient mechanical robustness are still poorly solved.

In the papers [1], [2] the approach of increasing the mechanical robustness of the superhydrophobic structure through the use of materials with increased elasticity was successfully applied. Considering this results, it was assumed that using bilevel hierarchical structures with increased elasticity can improve the mechanical wear resistance of superhydrophobic materials.

In the research series of elastomer coatings, that forms superhydrophobic outer layers were produced. The relation between elastic modulus of film forming polymer and wear resistance of the coating is established. The influence of the filler fraction parameters on wear resistance is also considered.

It was determined that the increasing of elasticity of polymer matrix leads to the improvement of wear behavior of the polymer composite. Use of hierarchical structures of fillers causes surface elements with the hybrid micro- nano-roughness structure formation.

1. *W. Ye, Q. Shi, J. Jin et al.* Superhydrophobic Coating of Elastomer on Different Substrates with a Liquid Template to Construct a Biocompatible and Antibacterial Surface // J. Mater. Chem. B. - 2014. – 2(41). – P. 7186-7191;
2. *Saarikoski, F. Joki-Korpela, M. Suvanto et al.* Superhydrophobic elastomer surfaces with nanostructured micronails // Surface science. – 2012. – (1-2). – P. 91-98