

Nanocomposites and nanomaterials

Large-scale solution for superhydrophobic surfaces

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Nanoscale texturing of surfaces provides the controlled change of their energy, thus causes the possibility of direct control of interphase interactions at the borders of solid surface and liquid layer. One of the examples of such control is surfaces with essentially increased hydrophobicity [1-3]. They repel aqueous liquids due to the super high value of corresponding contact angle – more than 150° and low wetting hysteresis. Surfaces mentioned above are called “superhydrophobic”.

Nowadays, laser, plasma and chemical etchings, electrochemical deposition and others required approaches to perform belong to existing technologies of surface nanoscale texturing [4]. Moreover, the area of texturized surface is essentially limited.

As a result of the research conducted, the texture required for obtaining of steady superhydrophobic effect can be fabricated by the use of hybrid micro-nanoscale hierarchical structures. The formation of such structures is possible from solutions, as well as from polymer dispersions. This fact strongly increases the processability in superhydrophobic surfaces technology. This approach was tested on the series of composites based on acrylic, vinyl and styrene polymers. Results obtained show that the primary importance has a structural factor of polymer, then its nature.

1. Roach P., Shirtcliffe N. J., Newton M.I. Progress in superhydrophobic surface development // *Soft Matter*. – 2008. – 4.- P.224.
2. Marmur A. Wetting on hydrophobic rough surfaces: To be or not to be? // *Langmuir*. –2003. –19, 20.- P. 8343-8348.
3. Oner D., McCarthy T.J. Ultrahydrophobic Surfaces. Effects of Topography/Length Scales on Wettability// *Langmuir*. –2000. –16.- P. 7777-7782.
4. Song J., Rojas O.J. Approaching super-hydrophobicity from cellulosic materials: A Review // *Nordic pulp and paper Research Journal*. – 2013. – 28,

No 2. – P. 216-238.