Femtosecond laser texturing of the surface of polymer products for wettability control

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Femtosecond laser processing of materials makes it possible to realize the creation of functional surfaces with modified thermohydrodynamic and mechanical properties, as well as the removal of nanolayers from massive and thin-film materials. The method of surface modification using femtosecond laser pulses has a number of distinctive and unique properties, indicating its technological suitability and effectiveness for solving a wide range of tasks in conditions of rapid technological development.

Within the framework of this work, the processes of femtosecond laser processing of polymers were studied in order to control their wettability and increase their hydrophobic properties. Schemes for processing polymer coatings with laser radiation are implemented when the power, speed and number of passes change. A scheme for measuring the wetting angle on treated surfaces has been assembled. Graphs of the dependence of the change in the wetting angle on the processing parameters are given.

A series of experiments were carried out, the result of which showed that by means of exposure to femtosecond laser radiation on polymers, it is possible to control the wettability of the material, moreover, it is possible to achieve its superhydrophobicity. The obtained samples were studied using optical microscopes and Raman spectroscopy.

Despite significant advances in the field of femtosecond polymer processing, there remains a need for further improvement of technological processes in relation to a specific technical task. In addition, a more detailed study of the phase and chemical composition of the treated surfaces will allow us to get closer to understanding the physical processes involved in the formation of new surface morphologies, which is extremely important for the development and creation of new technologies.