

## Investigation Physicomechanical Properties of Polyurethane Nanocomposites

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As is well known, polyurethanes possess the highest complex of the strength parameters. For many fields of the modern industry appreciable improvement of physicomechanical properties of polymeric materials is desirable. Nowadays, the most perspective decision of this problem is a modification polymer with nanostructure modifiers - creation of polymeric nanocomposites.

A number of polyurethanes modified with nanocarbons particles (0.5 mass.% Diamonds carbon black – “diamond blend”) is synthesized. DCB is the product directly produced with explosive synthesis. It contents of about 50 mass.% of the crystal phase.

Physicomechanical properties of the polyurethanes nanocomposites on the basis of polyether, hydrocarbonic polyether, polyester are investigated.

Appreciable improvement of physicomechanical properties for polyurethane on the basis of hydrocarbonic polyether is shown. It is assumed, that the effect of reinforcement is caused by formation of additional supramolecular structure, generated under action of power fields of nanocarbons. The last circumstance compensates rather weak intermolecular interaction polyurethane macrochains on hydrocarbonic polyether in comparison with polyurethanes on polyether and/or polyesters.

It was shown, that for polyurethanes with the flexible block (polyether and/or polyester), effect of reinforcement could not be received. On the contrary strength parameters of the nanocomposites has deteriorated. Possibly, the reason is that nanocarbons modification of polymer, even a minimum quantity, breaks inter- and supramolecular structures of polyurethane macromolecules with formation of new spatial structures.

Observable improvement of properties has made nearly of 15-20%. In view of that, polyurethanes possess of the high strength parameters among elastomers. So it is possible to consider such increase of reinforcement effect significant.