

## Nanotechnology and nanomaterials

### Investigation of properties of nanocomposites based on phenylone

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Currently, there is a large amount of polymer composite materials in the world, which are used in various fields of industry. The production of new functional materials is the current direction, which allows to significantly simplify and reduce the cost of production technology in case these materials are applied [1]. Because of their high demand, a growing number of scientific papers on the development of new composite materials appears in order to elaborate the materials with the improved properties.

Therefore, the approach to the choice of the matrix and the filling elements remains a major challenge. Carbon nanotubes are well-known due to their unique mechanical, electrical and thermal properties suitable for a wide range of applications in polymers. Their performance is several degrees higher than that of conventional engineering plastics. In connection with the foregoing, selected components thermoplastic matrix - polyamide C-1 (TS 6-05-221-101-71), organic fibers sulfone-T (fiber length of 3 mm, strength of 51-58 MPa, elongation of 16-18%, modulus of 600MPa, density of 1.45-1.46 g / cm<sup>3</sup>) and carbon nanotubes, dimensional nanoscale filamentary formations polycrystalline graphite cylindrical shape, the outer diameter of 20-70 nm and internal diameter of 5-10 nm and a length of 2-10 m, a bulk density of 0.4-0.6 g / cm<sup>3</sup>. Selected components, was prepared by mixing the components in a rotating electromagnetic field in the presence of ferromagnetic particles. The thus prepared mixture of the product was processed into the block ware by compression molding [2]. The combination of the properties and forms of the components that is compatible with modern technology of polymer processing ensures the development of new structural materials.

The investigation of the developed nanocomposites has shown the improvement of the mechanical properties performance by 1.75 times compared to the base polymer, as well as the decrease of the coefficient of friction by 3.5 times.

1. Mel'nyk A.V., Khokhlov P.V., Tkachov A.H. Functionalization of carbon nanotubes organotitanates // VSU Bulletin series: Chemistry. Biology. Pharmacy.- 2013, № 1. - P. 31-35.

2. Burya O.Í., Naberezhna O.O., Solod V.YU., Shchetinín O.M. Polimerna kompozitsiya. Patent of Ukraine on korisnu model № 104723. stated. 21/09/2015. Number u 2015 09077; publ. 10.02.2016 in Bul. Number 3.