

# Nanocomposites and nanomaterials

## The interaction peculiarities of the carbon nanospheres with different solvents

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In recent years, much attention has been paid to improve the preparation of carbon nanoparticles. The nanoparticle sizes depend on the methods of their production. After the carbon nanoparticles synthesis they could be divided using destructive (oxidative, modification) and non-destructive (centrifugation, filtration) methods [1]. These methods are not quite effective.

The investigated carbon nanospheres (CNSs) were obtained as soot from the arc discharge of propane-butane mixture. The material consists of more than 98 wt% carbon, trace amounts of oxygen and hydrogen and no metallic impurities. The sizes of obtained nanospheres varies from 3 to 45 nm. The treatment of the CNSs with bromine and nitric acid was also carried out to obtain the surface-modified nanoparticles of bromine and carboxylic groups respectively.

The different behavior of the CNSs in several solvents was revealed. The particles of about 3 nm in diameter interact well with N-methyl-2-pyrrolidone, thus particles larger than 3 nm precipitate from the solvent. Benzyl alcohol dissolves nanospheres no more than 9 nm in size. Dimethylformamide dissolves nanoparticles no more than 25 nm in size.

Thus, carbon nanoparticles could be effectively separated by size. This would provide more opportunities for the application of such nanomaterials in various fields.

1. *Deshmukh A., Mhlanga S., Coville N. Carbon spheres // Materials Science and Engineering R. – 2010. – 70. – P. 1–28.*