Composites based on superhigh-molecular poly(ethylene) and carbon nanostructures

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The investigation results of superhigh-molecular poly(ethylene) modified by fullerene, carbon nanotubes, amorphous carbon and 3d metals particles with carbon cover have been presented in this paper.

The influence of fullerene and carbon nanotubes on the impedance characteristics of composite consists of them and superhigh-molecular poly(ethylene) was investigated by us earlier [1]. In order to determinate electrophysical properties of superhigh-molecular poly(ethylene) composites synthesized by us the method of impedance investigation in long range of frequencies and temperatures was used.

Ni and Fe nanoparticles had carbon cover with functional OH groups (see Figure). The investigation of behavior of real and seeming components of impedance has been shown that conduction, dielectric and magnetic properties depend on nanoparticles concentration. During determinate concentration of nanoparticles the material absorbed electromagnetic radiation completely in the band of investigates frequencies.

The conversion of superhigh-molecular poly(ethylene) in conductive material, i.e. appearance of antistatic properties, starting with determinate concentration of nanodispersed carbon, is one of significant results. Using of modified nanoparticles, mechanical properties were improve significantly and most of all resistance to wear.
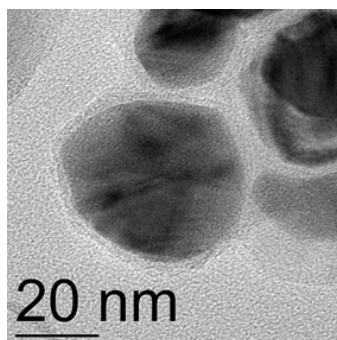
Figure. Electron microscope image of Ni nanoparticles modified carbon cover.

[1]   Drokin N.A., Fedotova A.V., Glushchenko G.A., Churilov G.N., *Physics of Solid State* **52**, 657 (2010).