

Nanocomposites and nanomaterials

Bimetallic Ag_xCu_y nanoparticles stabilized by polybutylmethacrylate as the fillers for electroconductive compositions

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It is proposed a method for the synthesis of bimetallic nanoparticles Ag_xCu_y with simultaneous stabilization of their surface by polybutylmethacrylate under conditions of heterogeneous nucleation. The shape and the size of synthesized nanoparticles Ag_xCu_y were investigated by the method of electron microscopy. It was established that all obtained bimetallic nanoparticles are spherical shape with an average diameter of 70 ± 30 nm. With the use of X-ray diffraction analysis it was investigated the phase composition of obtained bimetallic nanoparticles Ag_xCu_y and it was determined that their elemental composition is satisfactorily agreed with the original ratio of the components. At the same time, it was shown that the stability to oxidation of synthesized bimetallic nanoparticles increases with the increasing of silver content in them, which may indicate the formation of eutectic mixtures of silver and copper. Based on the data of energy dispersive spectroscopy and IR spectroscopy of obtained products it was proposed the scheme of the formation of stabilizing shell on the surface of bimetallic nanoparticles Ag_xCu_y , which includes the initiation process by hydrazyl-radical and following polymerization of butylmethacrylate from the surface of the particle. It was shown the possibility of the use of synthesized nanoparticles Ag_xCu_y as the fillers for electroconductive polymeric compositions, the high electrical conductivity of which is provided by the formation of chains involving the nanoparticles Ag_3Cu .