Nanocarbon materials and polymers

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A comparative study the influence of nanocarbon materials on structure and physical properties of amorphous and crystallising polymers has been done. As objects of research used polyethylene of low density, isotactical polypropylene, polyvinyl alcohol, atactic polymethylmethacrylate, polystyrene and polytetra-fluoroethylene. The fillers from nanocarbon materials as fullerene C_{60}, fullerene soot, multiwall carbon nanotubes, nanodiamonds has been used. The nanocomposite film materials have received by formation from solutions in aromatic solvents and from melts. The concentration of fillers varied in the range of C=0.1-10%mass. In these investigations the methods of X-ray scattering, calorimetric, optical and mechanical tests were used. Light resistance of polymers studied in the conditions of photoageing, a bilateral UV-irradiation of samples made from a source of cold luminescence BUV-30 with length of a wave λ =254nm. On the basis of these study the general features of variations of structure and technical properties of the amorphous and crystallizing polymers, which modified by nanocarbon materials are established. Adoption of fillers is accompanied by following effects: 1) at small concentration of fillers C=0.1-1%mass. there is an increase of durability of polymers to 10-50% at a deformability invariance; their light resistance increases at a constancy of temperature of melts; 2) at concentration of fillers C >1%mass. deformability of polymers sharply decreases at slow recession of durability; reduction of temperature of melt of polymers to 10° and increase of light resistance of samples has been observed; 3) formation of crystalsolvates in some crystalline polymers also observed; 4) brightness of display the variation of properties of polymers depends on their chemical structure, presence of lateral assistants of different nature, a physical states of amorphous and crystalline polymers, molecular both supermolecular morphology of polymers and fillers also, their activity, technology of reception of materials and etc.