

INFLUENCE OF CARBON NANOTUBE FILLERS ON CHANGE OF MECHANICAL PROPERTIES OF POLYIMIDE COMPOSITE FILMS

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Abstract:

Features of the change in mechanical properties under the influence of the fillers of their carbon nanotubes were studied by methods of uniaxial tension on an «Instron 5982» tensile machine with the Bluehill 3 program. Comparative tests of pure and composite polyimide films with concentration of filler $C = 0.005 - 0.07$ mass. % and thickness $d = 75 - 82 \mu\text{m}$ were carried out. It has been established that with an increase in the concentration of carbon nanotubes in polyimide composite films, the mechanical strength increases significantly as compared to a pure polyimide film. The results of research have shown that when filler concentration C is 0.005 mass. %, the breaking point $\sigma \approx 60$ MPa, which is 10 MPa lower than the strength of a pure polyimide film, and at filler concentration $C = 0.07$ mass. % the breaking point $\sigma \approx 133$ MPa, the strength of the material increased by almost 73 MPa.

Key words: carbon nanotubes, polyimide composite films, mechanical properties, strength.