Alignment of single-wall carbon nanotubes along preferred axis in suspensions and polymeric films

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Physical properties of single-walled carbon nanotubes (SWNTs) have an anisotropic character due to their unique geometrical structure. In order to observe and to investigate an anisotropic character of SWNT ensemble it is necessary to form a massif of nanotubes oriented along some preferential direction [3].

The ordering of SWNTs along some preferred axis could be achieved using the self-assembly process of nanotubes in suspensions [1]. The substrate was placed into an enriched suspension of SWNTs. SWNTs precipitated on the substrate during the evaporation of the liquid, keeping horizontal orientation along the line of meniscus. SWNTs ordering may be also reached by the mechanical stretching of different polymeric films with nanotubes implemented [2].

It was discovered that the width of the angular distribution of nanotubes in the structures described above was equal to 7 degrees. The polarization dependence of the main Raman modes was investigated for semiconducting and metallic SWNTs. The laser wavelength was $\lambda = 647$ nm. The behavior of these modes varied depending on the relative orientation of the sample and the polarization of the incident radiation. That can be explained by the different mode symmetry.

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