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Flow Effect on Alignment of MWCNTs in Polymer Nanocomposites MASHAEL ALGHAMDI, Worcester Polytechnic Institute, GEORGI GEORGIEV, Assumption College, GERMANO IANNACCHIONE, Worcester Polytechnic Institute — Polymer nanocomposites are grabbing attraction for their light weight, low cost, and enhanced characteristics. In this study, we present fabrication of polyethylene films embedded with multiwalled carbon nanotubes (MWCNTs) with anisotropic characteristics. A well dispersion of the MWCNTs in melt polyethylene is controlled through sonication to overcome their natural tendency to aggregate. An elongation process is demonstrated by free flowing on temperature-controlled surface in order to create organized long- range alignment of the nanoparticles within the host polymer matrix. The samples harvested off substrate after cooling down are of high anisotropy. Cross-polarized microscopy demonstrated that the polarization is directionally dependent and hence enhanced alignment in the flow direction. Therefore, they are expected to have orientation- dependent electrical, thermal, mechanical, and optical properties. Investigation conducted is on how flow rate, surface temperature, polymer molecular weight, concentration, and aspect ratio of MWCNTs affect the degree of polarization. The preliminary results show that they are extremely promising due to the possibility of creating nanocomposites with desired properties suit certain applications.

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