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# Drastic modification of the piezoresistive behavior of polymer nanocomposites by using conductive polymer coatings

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**Abstract**

We obtained highly conductive nanocomposites by adding conductive polymer poly(3,4-ethylenedioxythiophene)poly(styrenesulfonate) (PEDOT/PSS)-coated carbon nanotubes (CNTs) to pristine insulating Polycarbonate. Because the PEDOT/PSS ensures efficient charge transfer both along and between the CNTs, we could attribute the improvement in electrical conductivity to coating. In addition to improving the electrical conductivity, the coating also modified the piezoresistive behavior of the nanocomposites compared to the material with pristine uncoated CNTs: whereas CNT/Polycarbonate samples exhibited a very strong piezoresistive effect, PEDOT/PSS-coated MWCNT/Polycarbonate samples exhibited very little piezoresistivity. We studied this change in piezoresistive behavior in detail by investigating various configurations of filler content. We investigated how this observation could be explained by changes in the microstructure and in the conduction mechanism in the interfacial regions between the nanofillers. Our study suggests that tailoring the piezoresistive response to specific application requirements is possible.

*Keywords:* A. Carbon nanotubes, B. Polycarbonate, C. Piezoresistivity, D. Conductivity, E. Conductive polymer

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