

Graphene nanoplatelets as effective fillers for ESD (Electrostatic Discharge) application

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As a required property for the plastic containers/bags storing electronic components is the electronic conductivity on the surface thereof, the static dissipative coating or layer is generally needed. PEDOT:PSS, poly(3,4-ethylene dioxothiophene) polystyrene sulfonate, is the transparent, conductive polymer being used as the static dissipative layer on the PET film in the various ESD applications. Recently, Silicone coating layer became additionally used on top of the PEDOT:PSS layer to remove ESD film smoothly without leaving remnant materials on the electronic components. However, extra addition of the non-conducting release film undermines the ESD performance of product severely with the dramatic film resistance increase. In this work, Graphene nanoplatelets (GNP) prepared via simple GIC (Graphene intercalation compound) method were used as the effective electroconductive filler and compared to the other nano-carbon forms (e.g., SW-CNT, rGO). The combined usage of GNP and SW-CNT as fillers showed the best static dissipative performance without increase of film resistance compared to the other experimental cases. Further analyses showed the synergetic effect of different nano-carbon combination for the ESD application.

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Figures

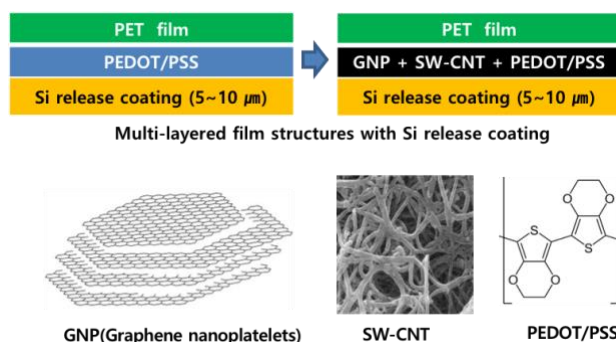


Figure 1: Structure of multi-layered polymeric film for the ESD applications with GNP and SW-CNT as electroconductive additives

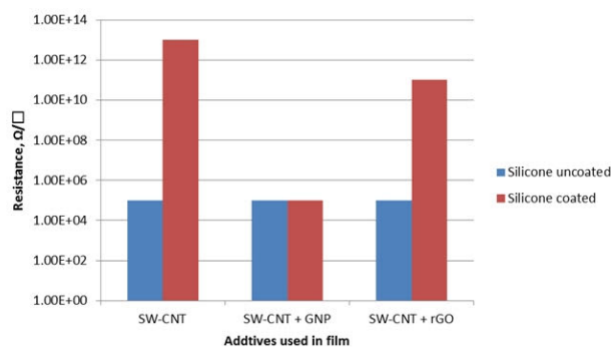


Figure 2: Comparative result of film resistance with various nano-carbon additives

References