

Thermal Treatment of Polymer based Single-walled Carbon Nanotube Transparent Conductive Films for Conductivity Enhancement

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Single-walled carbon nanotubes (SWCNTs) coatings on film have been investigated as transparent conductive films (TCFs) to alternate indium tin oxide (ITO) transparent electrode. In order to fully utilize the properties of SWCNTs in practical applications, efficient dispersion of SWCNTs is firstly required. Among many methods, non-covalent functionalization using polymeric dispersants has the advantage of obtaining exfoliated SWCNTs with high aspect ratio. However the remained polymer reduce electrical properties after TCF fabrication. Therefore for high conductivity post treatment to remove polymeric dispersants is necessary.

Here, poly[2-(dimethylamino)ethyl methacrylate]-co-polystyrene] (p(DMAEMA-co-St)) was used as a polymeric dispersant for SWCNT dispersion. SWCNTs/polymer coatings on glass substrates, were prepared by spin-coating method. Furthermore, thermal post treatments of TCFs were carried out to enhance their conductivity. The effects of thermal treatment were analyzed by scanning electron microscopy (SEM), Raman spectroscopy, and x-ray photoelectron spectroscopy (XPS).