

TRANSPARENT CONDUCTING THIN FILM BASED ON METAL NANOWIRE/CONDUCTING POLYMER HYBRID

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ABSTRACT

We demonstrated transparent conducting thin film based on AgNW/PEDOT:PSS composite for highly uniform electrical deviation and excellent optical transparency. These properties are achieved by incorporation of PEDOT:PSS on the AgNW networks. Generally, the aggregated regions and pore spaces formation in AgNW networks are greatly important to the electrical deviation of AgNW electrode. This problem could be overcome by filling the pore spaces with poly(3,4-ethylenedioxythiophene):poly(styrenesulfonate) (PEDOT:PSS) as conducting polymer and by optimizing the concentration of AgNW. To confirm electrical and optical properties of the AgNW/PEDOT:PSS hybrid composite films, we analyzed electrical percolation behavior, surface morphology, optical transparency and sheet resistance of the films by atomic force microscope (AFM), UV-vis spectroscopy, and 4-probe conductivity meter. As a results, transparent conducting thin films of multi-layer AgNW/PEDOT:PSS hybrid composite have a greater electrical percolation behavior and more good electrical deviation than conducting films of bare AgNW and single-layer AgNW/PEDOT:PSS hybrid composites.

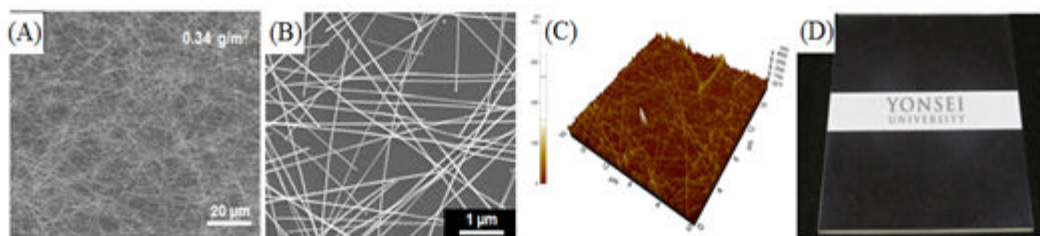


Fig. 1: SEM, AFM and transparent thin films images of multi-layer AgNW/PEDOT:PSS hybrid