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## Conductivity and dielectric properties of PEDOT-PSS doped DMSO nano composite thin films

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### Abstract

Poly(3,4-ethylenedioxythiophene); poly(styrenesulphonate) (PEDOT-PSS) is one of the most successful polymer for many of the electronic applications. It can be easily dispersed in water and few polar organic solvents. It is well known that the PEDOT-PSS dispersed in aqueous solution has very low conductivity which hinders its application as a transparent electronic material. In this paper we report the conductivity enhancement and dielectric parameters of PEDOT-PSS transparent films prepared using DMSO as an organic solvent. The structural properties of prepared films were investigated by SEM, UV-visible spectroscopy and FTIR spectroscopy. The SEM studies on these films indicate the formation of granular islands in the composite films. The FTIR spectra of DMSO in PEDOT-PSS indicate the shifting of characteristics peaks at higher wave number with the decrease in peak intensity in comparison to the pristine PEDOT-PSS. The UV-visible studies show the sharp absorptions around 500-700 nm at NIR range for the PEDOT-PSS doped with DMSO. It is observed that the addition of DMSO does the conformational change in the PEDOT-PSS from coil structure to linear structure. The change in morphology due to addition of DMSO brings feasibility in charge transportation through PEDOT backbone of polymer chain resulting in conductivity enhancement and low dielectric permeability and tangent loss in the composite thin films. It is observed that, the addition of DMSO increases the conductivity of pristine PEDOT-PSS by three orders of magnitude. Therefore, these DMSO doped PEDOT-PSS can be used in many optoelectronic applications as a transparent and flexible conducting polymer.

### Keywords

**KeyWords Plus:** POLYMER SOLAR-CELLS; TRANSPARENT ELECTRODE; ENHANCEMENT; PERFORMANCE

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