

## Polyvinyl Alcohol Processed Templated Polyaniline Films: Preparation, Characterization and Assessment of Tensile Strength

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**Abstract :** Polyaniline (PANI) is one of the most extensively studied material among the conducting polymers due to its simple synthesis by chemical and electrochemical routes. PANIs have advantages of chemical stability and high conductivity making their commercial applications quite attractive. However, to our knowledge, very little work has been reported on the tensile strength properties of templated PANIs processed with polyvinyl alcohol and also, detailed study has not been carried out. We have investigated the effect of small molecule and polymers as templates on PANI. Stable aqueous colloidal suspensions of trisodium citrate (TSC), poly(ethylenedioxythiophene)-polystyrene sulfonate (PEDOT-PSS), and polyethylene glycol (PEG) templated PANIs were prepared through chemical synthesis, processed with polyvinyl alcohol (PVA) and were fabricated into films by solution casting. Absorption and infra-red spectra were studied to gain insight into the possible molecular interactions. Surface morphology was studied through scanning electron microscope and optical microscope. Interestingly, tensile testing studies revealed least strain for pure PVA when compared to the blends of templated PANI. Furthermore, among the blends, TSC templated PANI possessed maximum elasticity. The ultimate tensile strength for PVA processed, PEG-templated PANI was found to be five times more than other blends considered in this study. We establish structure&ndash;property correlation with morphology, spectral characterization and tensile testing studies.

**Keywords :** surface morphology, processed films, polyvinyl alcohol, templated polyanilines, tensile testing

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