

Effect of Pre-stretching and the use of parallel microstructures in the electromechanical properties of strain sensor based on PEDOT-thermoplastic polyurethane hybrid prepared via in situ vapor phase polymerization

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Demand has been growing for systems that can provide detection of mechanical deformation such as strain sensors. Traditional strain sensors use metals, alloys, and semiconductors. However, these materials limit the use of the sensor because of their low stretchability and sensitivity (gauge factor (GF)). In the case of the resistive-type, GF is given as  $(\Delta R/R_0)/\epsilon$ , where  $\epsilon$  is the applied strain,  $\Delta R$  and  $R_0$  are the measured change and initial resistance, respectively.

In this study, strain sensors based on percolated networks of poly(3,4-ethylenedioxythiophene) (PEDOT) in thermoplastic polyurethane (TPU) matrix fabricated through in situ vapor phase polymerization (VPP) is reported. The aim of the study is to be able to increase the sensitivity of the sensors by using pre-treatments such as pre-stretching and the use of parallel microstructures.