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Tunable Surface Properties of a Conductive PEDOT/EVAL blend

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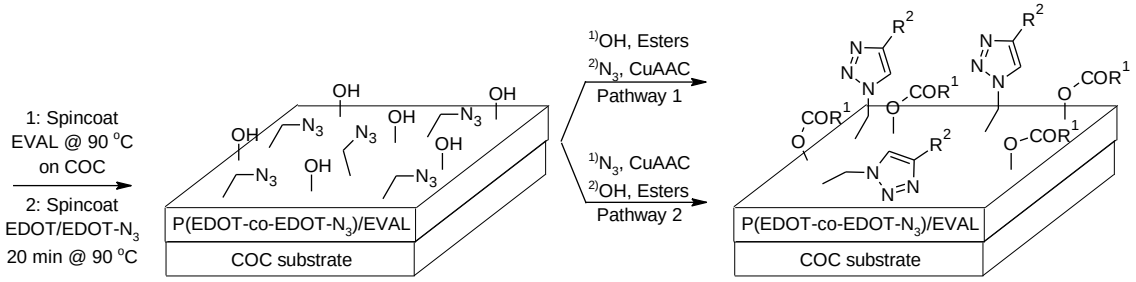
Conductive polymers have been studied extensively during recent years. Especially, poly(3,4-ethylenedioxythiophene) (PEDOT) have found many application areas and are broadly considered one of the most promising conductive polymers. In order to broaden the application field of PEDOT we have developed an azide functional poly(3,4-ethylenedioxythiophene) (PEDOT-N_3)[1]. The azide functional conductive polymer can be postpolymerization functionalized to introduce a large range of molecules onto the conductive backbone through click chemistry[2].

Here we present a study of the incorporation of poly(ethylene-co-vinyl alcohol) (EVAL) into a copolymer of EDOT and EDOT-N_3 (poly(EDOT-co-EDOT-N_3)). Poly(ethylene-co-vinyl alcohol) (EVAL) is known to swell in polar solvents, which was exploited in this study to permit a good blending of the two polymers. Since both polymers have residual functional groups the polymer blend permits post-functionalization through either the alcohols from EVAL or the azides from EDOT-N_3 (as shown in Scheme 1 below). In addition to this, the influence of the EVAL incorporation on the mechanical properties is tested.

The presented procedure is a simple and easy way to prepare functional PEDOT(N_3) with a substantially improved mechanical stability. The increase in mechanical stability together with high functionality broadens the possible applications of PEDOT as the mechanical stability of the polymer is of critical importance in many applications.



Scheme 1: Synthesis of reinforced PEDOT through a two step application procedure.

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