

Vapor-phase deposited conducting polymeric films and their applications

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A solvent-free method of oxidative chemical vapor deposition (oCVD) to synthesize conductive poly (3, 4-ethylenedioxythiophene) (PEDOT) films was demonstrated. The substrate temperature systemically controls the conjugation length. The doping level could also be tuned with substrate temperature. Moreover, the polymerization rate could be modulated with various oxidants, which significantly affects the surface morphology of PEDOT film. With milder oxidant, the surface morphology was highly nano-porous. Conformal coverage of PEDOT was also observed on trench structures and paper mats. Furthermore, with this simple one-step method, PEDOT film could be grafted on various kinds of organic substrates. Huge increase in adhesion strength was consistently observed.