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Supporting Information

Fast, Direct, Low-Cost Route to Scalable, Conductive, and Multipurpose Poly(3,4-ethylenedixoythiophene)-Coated Plastic Electrodes

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Supporting Information

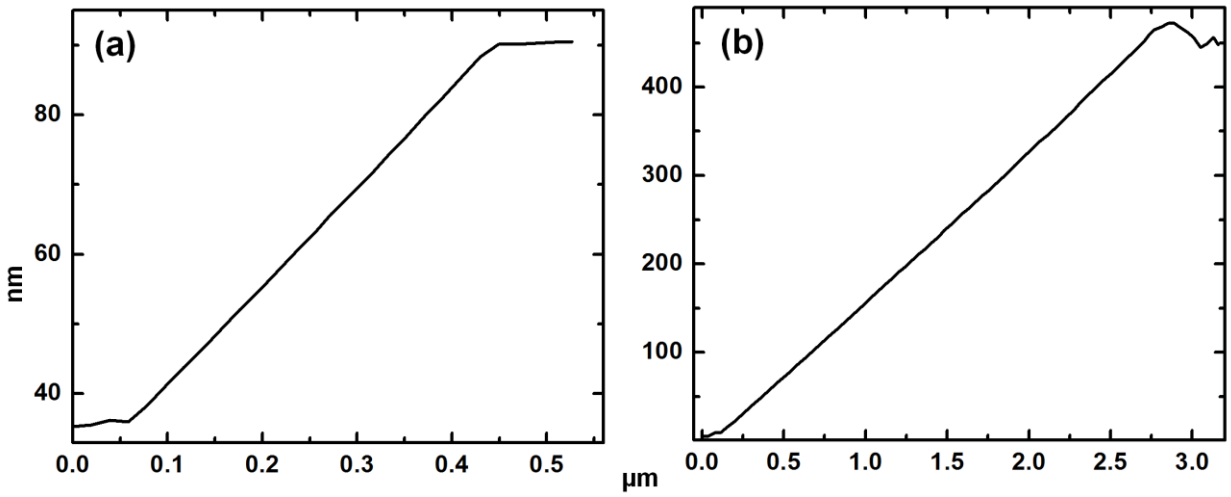

Figure S1. Representative sectional profiles of the steps for the PEDOT/PET films obtained after stirring spans of (a) 1 and (b) 5 h.

Construction of quantum dot solar cells and characterization

A homogeneous and smooth TiO_2 (anatase phase, particle size < 25 nm, Aldrich) suspension was prepared in ethanol, by mixing TiO_2 (1 g) in ethanol (5 mL). The resulting white formulation was coated on FTO coated glass using a doctor blade method and annealed at 150 $^{\circ}$C for 40 minutes to enable evaporation of the solvent and adherence of TiO_2 to the substrate, followed by an annealing at 500 $^{\circ}$C for 1 h. CdS quantum dots (QDs) were deposited on the TiO_2 coated glass electrodes by successive ionic layer absorption and reaction (SILAR) method. The TiO_2/FTO electrode was sequentially immersed in four different beakers for about 30 s immersion time, in each solution. The first dipping solution contained aqueous $Cd(CH_3COO)_2$ (0.1 M, Merck) which, was followed by an ultrapure water rinse to remove superfluous acetate. The film was then immersed in aqueous Na_2S (0.1 M, Merck), and again followed by a water dip to remove the surplus sulfide. The immersion cycle was repeated seven times. The resulting films were yellow and were referred to as

CdS/TiO_2 electrodes. Quantum dot solar cells were assembled by using a CdS/TiO_2 electrode as the photoanode, a plastic coated PEDOT film with 80 nm thickness as the counter electrode and a solution of 0.1 M Na_2S in 3:7 v/v of deionized water:methanol was used as the electrolyte. Two more cells were prepared with exactly the same components, but by varying only the counter electrode; in one it was a plastic PEDOT film of 285 nm thickness and in the other it was a plastic PEDOT film of 400 nm thickness. I-V characteristics were measured using a Newport Oriel 3A solar simulator with a Keithley model 2420 digital source meter. A 450 W Xenon arc lamp with an irradiance of 100 mW cm^{-2} of Air Mass (AM) 1.5G was used as the light source; the spatial uniformity of irradiance was confirmed by calibrating with a 2 cm × 2 cm Si reference cell traceable to NREL and re-confirmed with a Newport power meter.