Electronic Supplementary Material (ESI) for Nanoscale.

Supplementary Information

Pulsed Laser Deposited Porous Nano-Carpets of Indium Tin Oxide and Their Use as Charge Collector in Core-Shell Structures for Dye Sensitized Solar Cells

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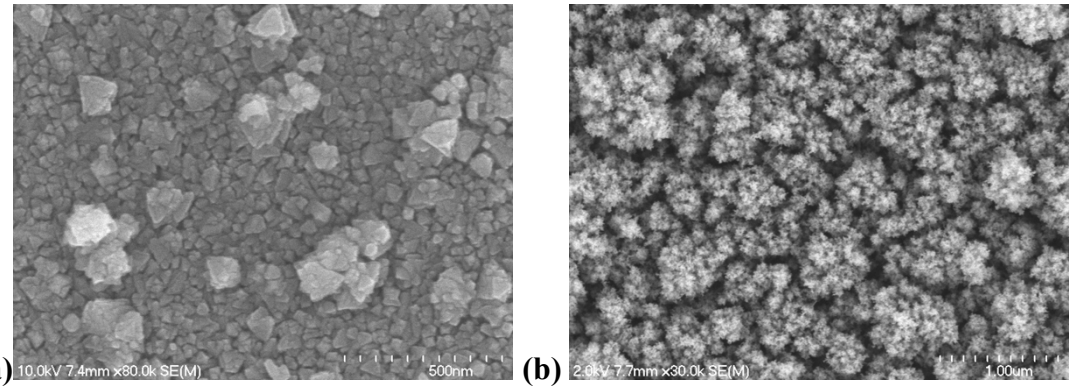

Fig. S1 SEM images of ITO films (top view) deposited at (a) 200C and (b) room temperature under a background pressure of 300 mTorr (Ar/O_2) with all other parameters held constant.

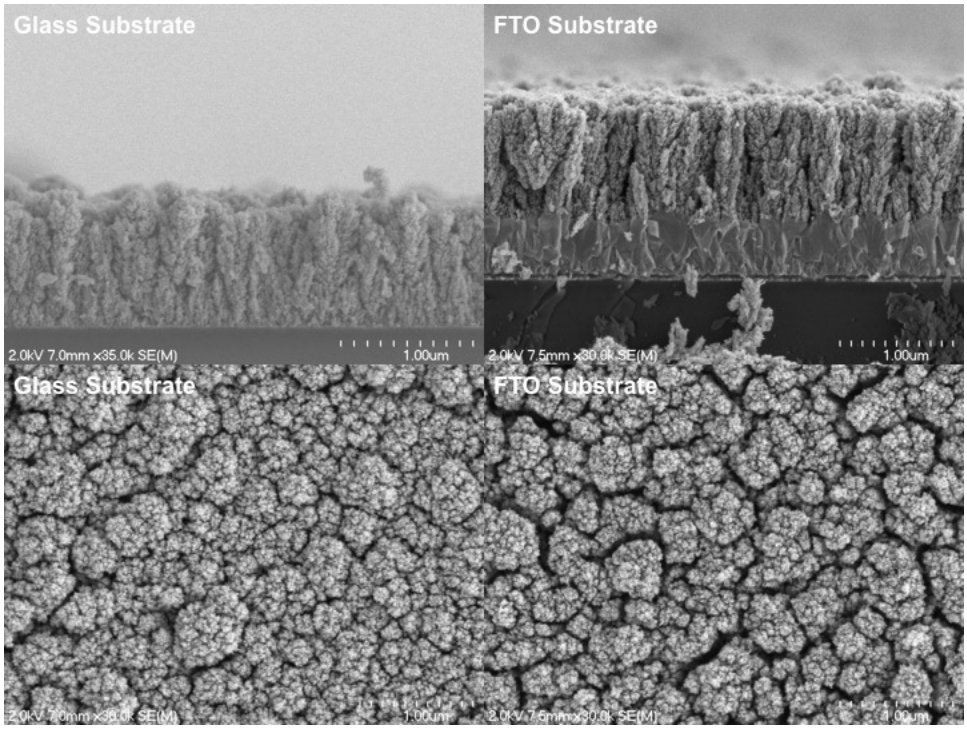

Fig. S2: SEM images comparing PLD ITO 200 mTorr deposited onto either and FTO or smooth glass substrate. The top images are looking down onto the tops of the film while the bottom images are cross sectional views. The number of laser pulses used to deposit each film were slightly different than each other resulting in different film thicknesses. These pictures show the similarity between depositing these films on smooth and rough substrates.

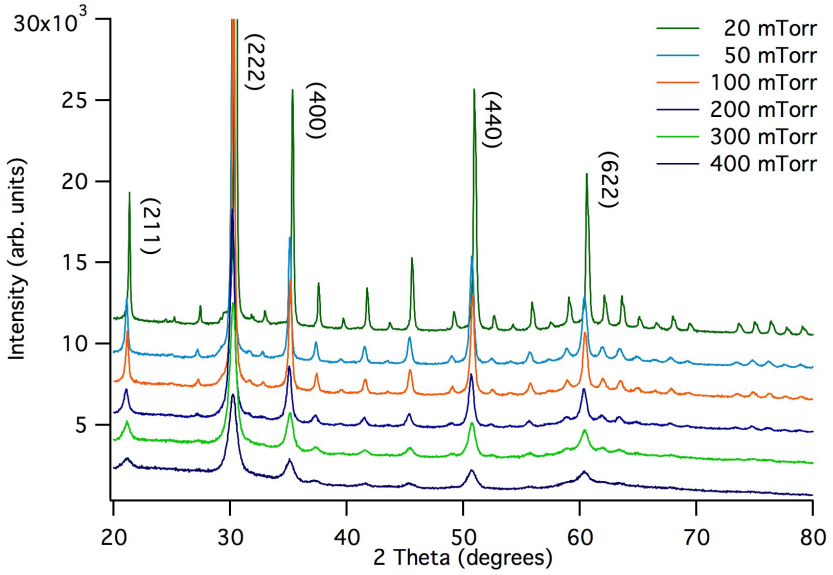

Fig. S3 X-ray (Cu-α) diffraction spectra acquired of porous ITO films deposited under variable background chamber gas pressures. The main In_2O_3 diffraction peaks are labeled.

Table S1 Crystal sizes derived from the Scherrer equation using the full width half maximum of the (222) plane peak for In_2O_3.

Deposition Pressure (mTorr)	Crystal Size (nm)
20	47.8
50	29.7
100	26.8
200	17.4
300	12.4
400	9.7

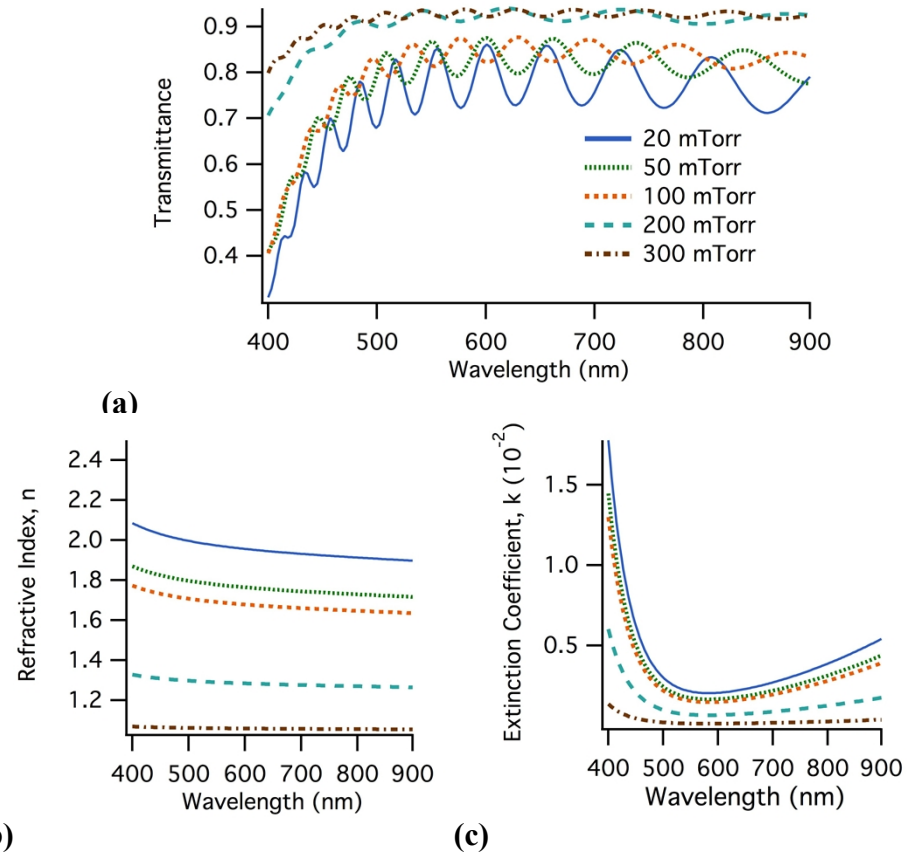

Fig. S4: Optical parameters (a) transmittance, (b) refractive index and (c) extinction coefficient derived from fits to ellipsometric data of PLD ITO on silicon substrates that were deposited under a range of background gas pressures. PLD ITO film thicknesses were 1.7, 1.7, 1.9, 1.6 and 3.7 μm for 20, 50, 100, 200 and 300 mTorr films, respectively.

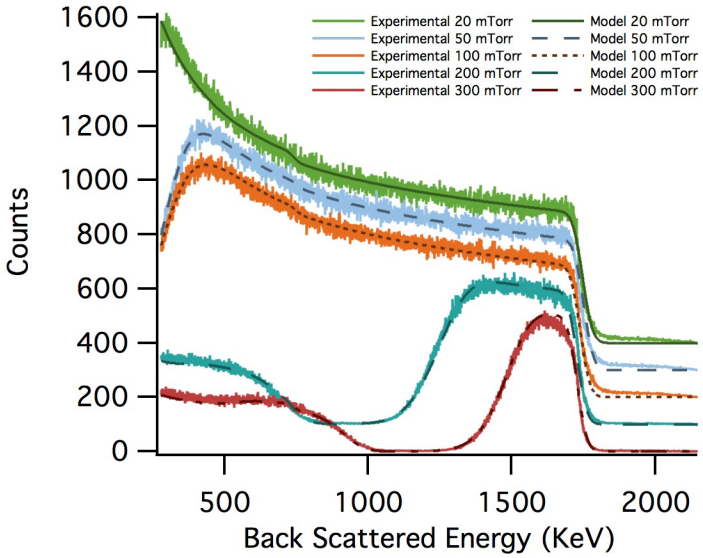

Fig. S5: Rutherford backscattering spectra of PLD-ITO films from backscattered He nuclei collected at 160 degrees from incident path. Model fits are overlayed onto raw spectra.

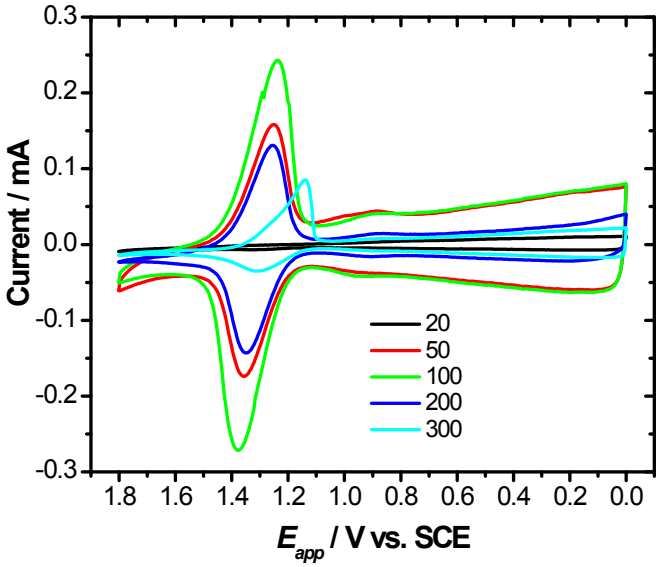

Fig. S6 Cyclic voltamagrams of Ru-C derivitized PLD-ITO films deposited at varying pressures.

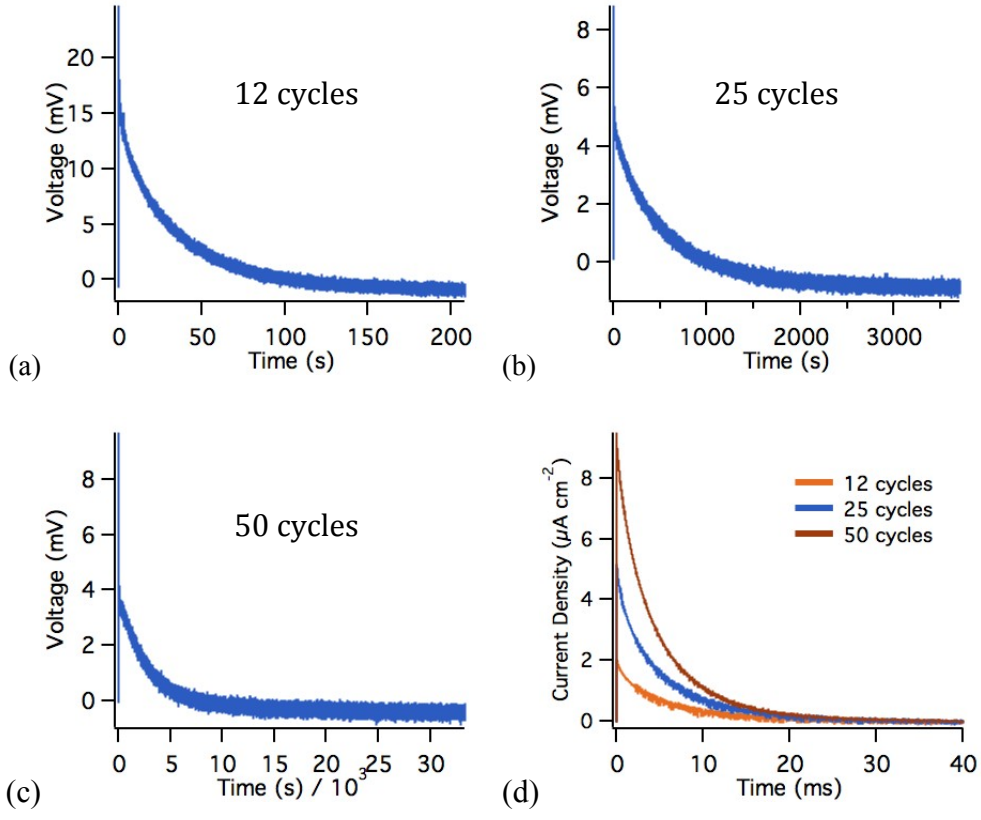

Fig. S7 Pulsed laser open circuit voltage transients (a)-(c) and short circuit current transients (d) for DSSCs made from PLD ITO 200 mTorr films with ALD TiO2 conformal coatings of various thicknesses (cycles).