TiO_2 fibers enhance film integrity and photovoltaic performance for electrophoretically deposited dye solar cell photoanodes

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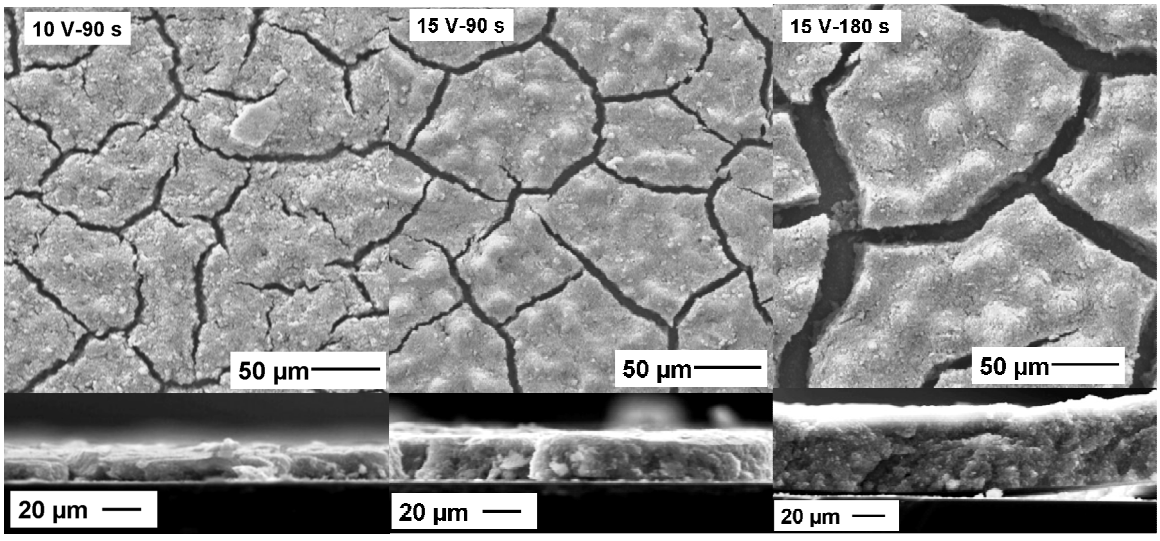


Figure S1. The top-view as well as cross section SEM images of electrophoretically deposited films for comparison of the role of time and voltage of EPD on crack and film detachment.

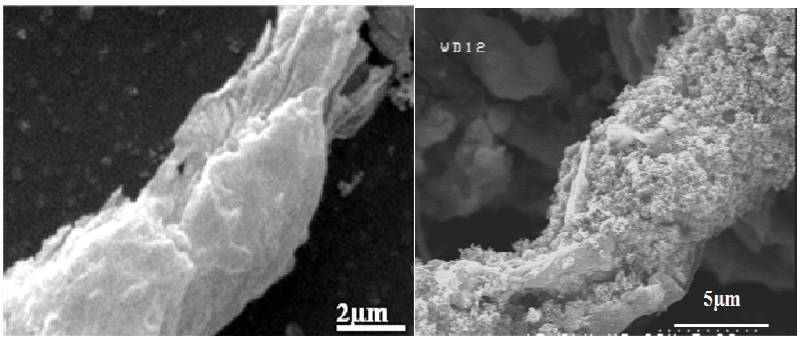
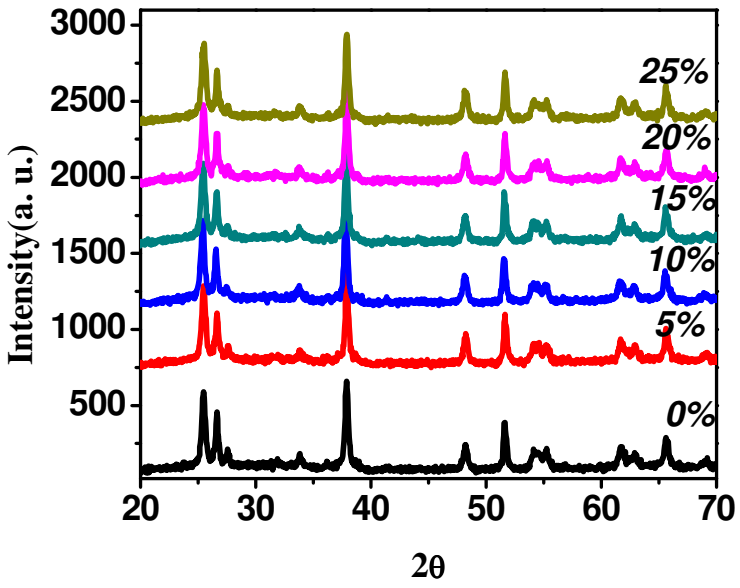


Figure S2. SEM image of an individual fiber before EPD (left) and the fiber inside the film after EPD (right), the uniform coverage of fiber by P25 nanoparticles shows the strong attachment of fiber-nanoparticles after EPD



Figrue S3. The XRD data of EPD films with varying fiber contents.

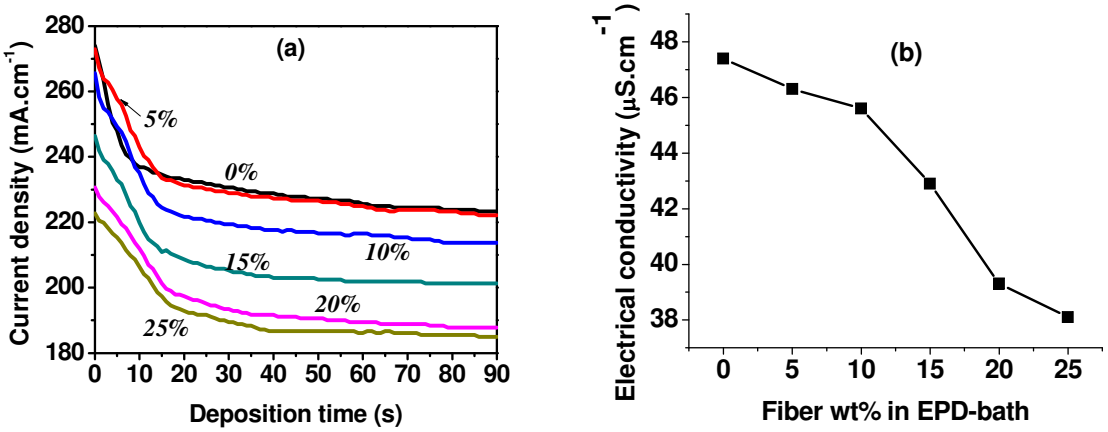


Figure S4. Comparison of the adsorbed ions on the fibers and P25 nanoparticles; (a) The variation of EPD-current density during the EPD-time for varying fiber contents in the EPD-bath; (b) the role of fibers on the electrical conductivity of the EPD-bath.

The trends and shapes of all the chronoamperometric curves of EPD of fiber/nanoparticle in figure S4(a) are similar which indicates that the mechanism of EPD has not changed due to the presence of fibers. The higher surface area of fibers in comparison with P25 nanoparticles has resulted in higher adsorption of the free H^+-ions in the bath which is accompanied by the decrease of EPD-current in Figure S4(a) as well as electrical conductivity of EPD-bath in Figure S4(b).

Table S1. The properties of DSCs at various fiber content, derived from current density-voltage curves.

Fiber content	V_{OC} (V)	I_{SC} (mA/cm^2)	Efficiency (%)	Fill Factor
0%	0.75	4.6	2.46 ± 0.09	0.71
5%	0.77	6.77	3.75 ± 0.06	0.72
10%	0.78	7.11	3.93 ± 0.07	0.70
15%	0.76	7.55	4.01 ± 0.11	0.70
20%	0.75	8.5	4.08 ± 0.09	0.65
25%	0.73	7.09	3.50 ± 0.11	0.67