Supplementary Materials

Soft-Microstructured Transparent Electrodes for Photonic-Enhanced Flexible Solar Cells

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Section S1. AFM results

Figure S1 shows the top-view morphology measured via AFM of the same IZO microstructures presented in Fig. 4 of the main article as example, which are among the best-performing samples as shown in Fig. 5, with two different initial PS spheres sizes and IZO sputtering time. From these profiles, acquired for these and the other samples of this study, it was possible to determine the average interspacing and height of the IZO structures, and correlate it with the expected equivalent IZO film thickness which is proportional to the sputtering time.

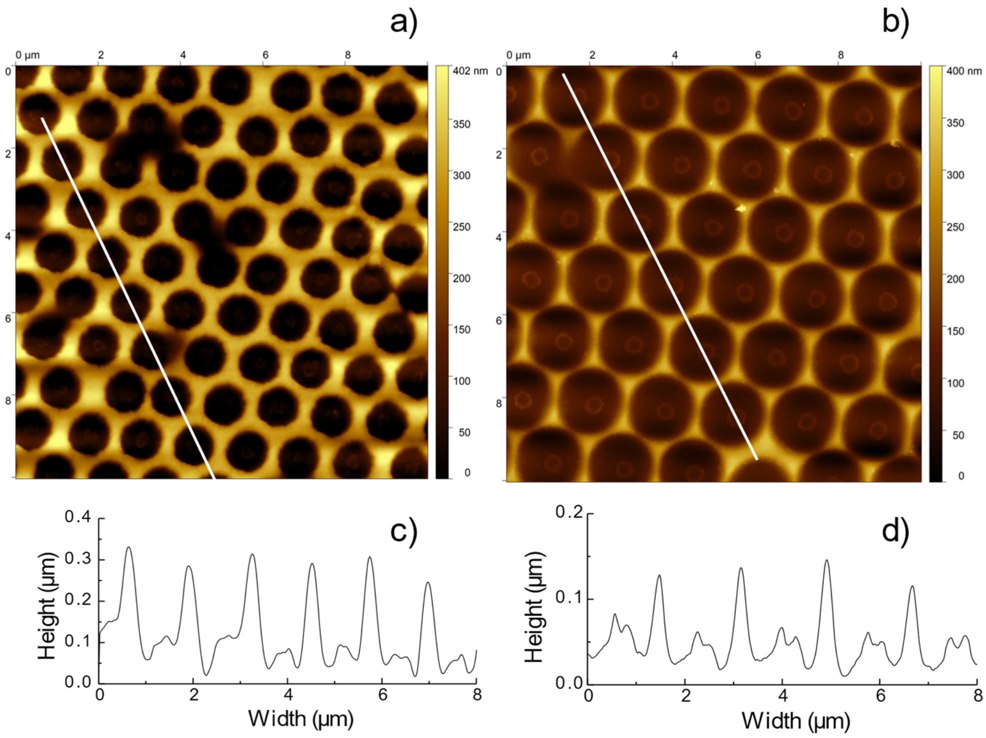

Figure S1. Top-view analysis of the 3D AFM images shown in Figure 4 of the main article, used to correlate the resulting IZO features' height with the IZO deposition time, for (**a**) D = 1.3 μm PS spheres, t_{RIE} = 360 s and 130 min of IZO sputtering, resulting in an average height of the IZO features of 0.303 ± 0.1 μm; (**b**) D = 2.0 μm spheres, t_{RIE} = 360 s and 100 min of IZO sputtering, resulting in an average height of the IZO features of 0.141 ± 0.1 μm, (**c**) and (**d**) the respective profiles measured on the diagonal.

Section S2. Absorption spectra

Figure S2 shows the absorption spectra for the several fabricated structures (1.3 and 2.0 μm spheres' size, D) studied in the Main Manuscript. Specifically, each plot corresponds a different IZO thickness (h) and shows the curves for different RIE times (t_{RIE}).

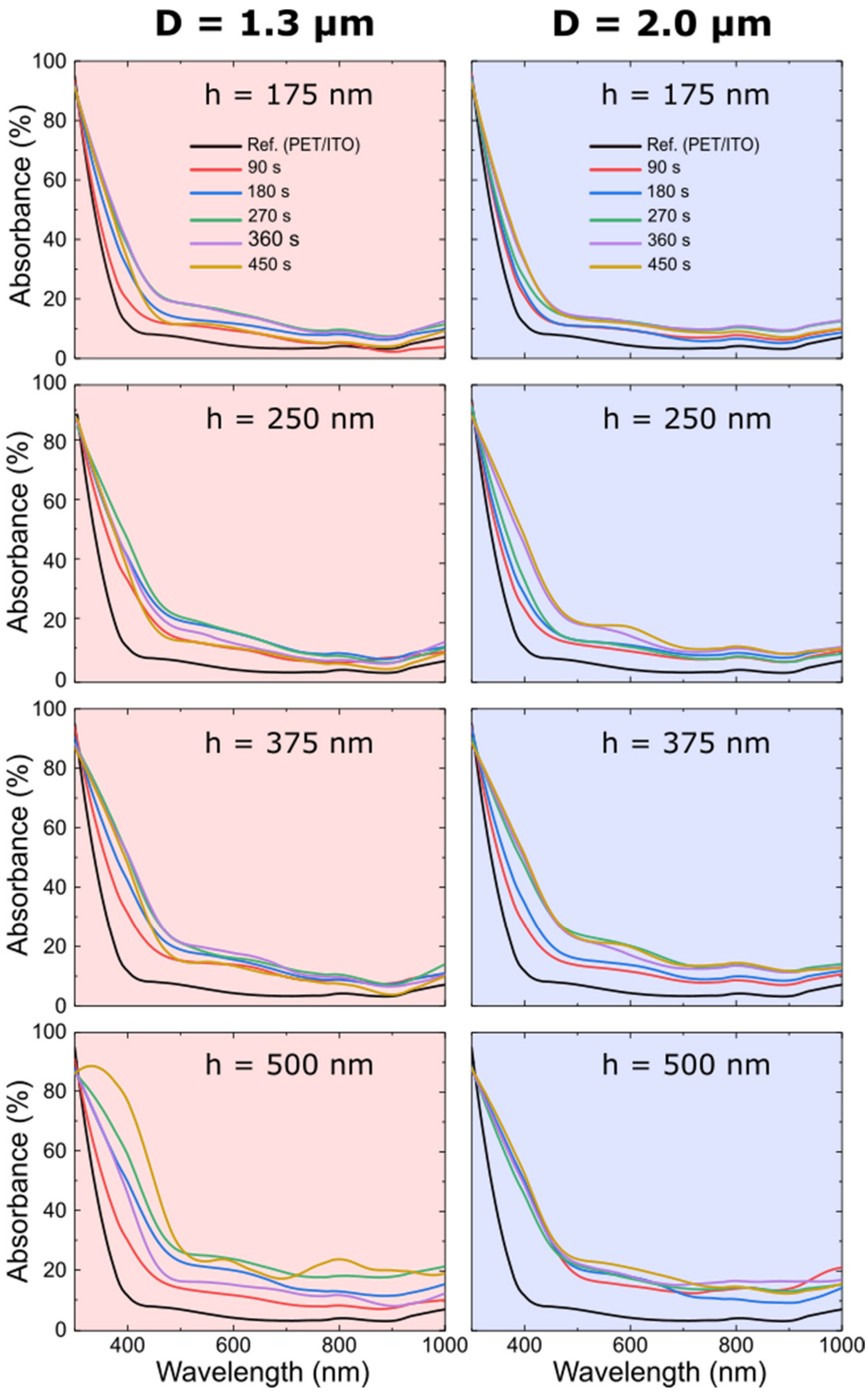

Figure S2. Absorbance spectra of the samples analysed in this work with different fabrication parameters of the CL process. The left plots correspond to structures made with D = 1.3 μm colloids (setting the array periodicity) and different values of the t_{RIE} and IZO film thickness (h). The right plots correspond to D = 2.0 μm, for different values of h and t_{RIE}. These spectra are compared with those of the reference (Ref, black lines) planar samples made of just the ITO-coated PET substrate.

Section S3. Diffuse and total transmittance spectra.

Figure S3 shows the respective diffuse and total transmittance of the already above-mentioned samples. Again, these measurements were necessary for the calculation of the figure of merit.

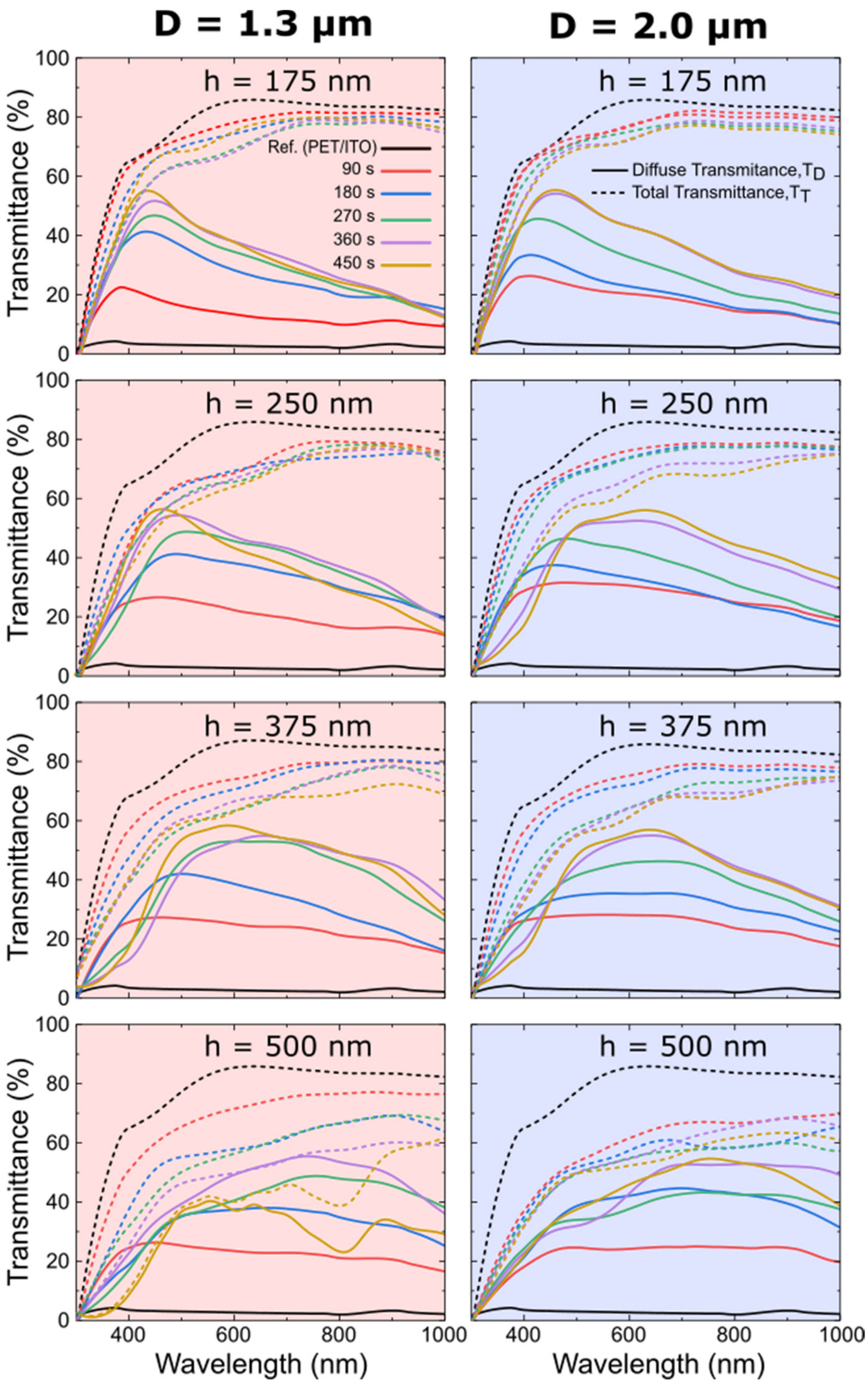

Figure S3. Diffuse and total transmittance of samples analysed in this work with different fabrication parameters of the CL process. The left plots correspond to structures made with D = 1.3 μm colloids (setting the array periodicity) and different values of the t_{RIE} and IZO film thickness (h). The right plots correspond to D = 2.0 μm for different values of h and t_{RIE}. These spectra are compared with those of the reference (Ref, black lines) planar samples made of just the ITO-coated PET substrate.

Section S4. Sheet Resistance

Table S1 lists the measured sheet resistance values for all fabricated samples analysed in this work.

Table S1. The tables compare the values of the sheet resistance, R_S, measured by the 4-point probe technique on the top surface of the samples.

		Sheet Resistance, R_S (Ω/□)							
Reference (PET/ITO)		**37**							
Colloid Diameter, D		**1.3 μm**				**2.0 μm**			
IZO thickness, h		**175 nm**	**250 nm**	**375 nm**	**500 nm**	**175 nm**	**250 nm**	**375 nm**	**500 nm**
Etching time, t_{RIE}	90 s	38	32	36	29	38	37	30	20
	180 s	27	34	25	28	14	34	27	34
	270 s	27	31	29	21	31	31	24	16
	360 s	24	34	24	24	28	28	25	25
	450 s	22	21	26	26	27	30	19	26