

## Supporting Information

**Table 1.** Electrical characteristics for ssDSCs of various filling fractions.

Sample name	Spiro-MeOTAD concentration [mg mL <sup>-1</sup> ]	Overlayer thickness [μm]	TiO <sub>2</sub> thickness [μm]	Filling fraction [%]	Voc [mV]	Jsc [mA/cm <sup>2</sup> ]	FF [%]	η [%]
12	200	0.58	2	89.4	745.2	6.3	46.8	2.2
16	200	0.52	2	89.5	741.4	3.7	61.2	1.7
35	200	0.32	3.1	65.5	734.9	5.7	54.0	2.3
13	100	0.19	2	37.8	731.3	5.2	58.7	2.2
32	100	0.01	3	28.6	718.8	5.2	57.0	2.1
15	25	0.00	2.3	8.3	356.3	0.4	32.9	0.0
34	25	0.00	3.7	6.1	316.9	0.3	29.9	0.0

**Table 2.** Comparison of characteristic penetration length (CPL), desorbed mass, and mass in pores for ssDSC samples

Sample name	TiO <sub>2</sub> thickness [μm]	Spiro-MeOTAD concentration [mg mL <sup>-1</sup> ]	Filling fraction [%]	Calculated mass in pores [μg/mm <sup>2</sup> ]	Calculated mass [μg/mm <sup>2</sup> ]	Desorbed mass [μg/mm <sup>2</sup> ]	CPL [μm]	CPL with viscosity correction [μm]
12	2	200	89.4	1.22	1.80	1.17	1.79	1.32
16	2	200	89.5	1.22	1.73	1.11	1.79	1.32
13	2	100	37.8	0.51	0.70	0.57	0.76	0.70
32	3	100	28.6	0.58	0.59	0.53	0.86	0.79
15	2.3	25	8.3	0.13	0.13	0.12	0.19	0.18
34	3.7	25	6.1	0.15	0.15	0.14	0.22	0.22
Average [a]	2.4	200	80.9	1.25	1.78	1.14	1.86	1.36
(std dev.)	(0.6)		(13.2)	(0.1)	(0.15)	(0.04)	(0.1)	(0.1)
Average [b]	3.7	180	80.9	1.25	1.78	1.14	1.86	1.36
(std dev.)	(1.2)		(13.2)	(0.1)	(0.15)	(0.04)	(0.1)	(0.1)
Average [c]	2.31	100	35.9	0.53	0.69	0.62	0.78	0.72
(std dev.)	(0.6)		(11.6)	(0.05)	(0.15)	(0.12)	(0.1)	(0.1)
Average [d]	2.25	25	8.9	0.13	0.21	0.13	0.19	0.18
(std dev.)	(0.8)		(2.0)	(0.01)	(0.07)	(0.01)	(0.02)	(0.02)

[a] Average of 6 samples with thicknesses between 2 and 3.3 μm; [b] Average of 3 samples with thicknesses between 2.6 and 5 μm; [c] Average of 7 samples with thicknesses between 1.4 and 3.1 μm; [d] Average of 6 samples with thicknesses between 1.4 and 3.7 μm.