

ESI to accompany

Copper-based Dye-sensitized Solar Cells with Quasi-Solid Nano Cellulose Composite Electrolytes

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Table S1. Parameters of duplicate, masked DSSCs after 0(**a**), 7(**b**), 14(**c**), 21(**d**), 28(**e**) and 60(**f**) days of aging.

(a) Day 0	J_{sc} [mA/cm ²]	V_{oc} [mV]	P_{max} [mW]	FF [%]	η [%]
Ref (L) 1	2.76	535	0.063	71	1.04
Ref (L) 2	3.37	545	0.078	70	1.28
CNC0 1	0.10	644	0.002	51	0.03
CNC0 2	0.45	607	0.007	45	0.12
CNC5 1	1.60	479	0.012	25	0.19
CNC5 2	2.24	492	0.019	29	0.32
CNC10 1	2.29	505	0.019	27	0.32
CNC10 2	2.75	512	0.028	32	0.46
CNC20 1	2.61	531	0.032	38	0.53
CNC20 2	2.66	522	0.033	39	0.54
CNC40 1	2.23	571	0.052	67	0.86
CNC40 2	2.40	571	0.055	67	0.91
CNC60 1	2.77	575	0.056	58	0.93
CNC60 2	2.89	564	0.059	61	1.00
CNC80 1	2.97	579	0.066	64	1.10
CNC80 2	2.70	587	0.064	68	1.08
CNC100 1	2.12	604	0.040	51	0.65
CNC100 2	1.90	599	0.034	50	0.57

(b) Day 7	J_{sc} [mA/cm ²]	V_{oc} [mV]	P_{max} [mW]	FF [%]	η [%]
Ref (L) 1	2.16	590	0.056	73	0.93
Ref (L) 2	2.99	555	0.072	73	1.21
CNC0 1	0.13	724	0.003	52	0.05
CNC0 2	0.26	643	0.004	39	0.06
CNC5 1	1.47	496	0.010	23	0.17
CNC5 2	1.60	499	0.012	26	0.21
CNC10 1	1.90	501	0.014	25	0.24
CNC10 2	2.41	517	0.021	28	0.35
CNC20 1	2.40	537	0.027	35	0.45
CNC20 2	2.54	524	0.030	38	0.50
CNC40 1	1.99	577	0.046	67	0.77
CNC40 2	2.20	573	0.049	64	0.82
CNC60 1	2.60	577	0.055	62	0.93
CNC60 2	2.64	572	0.054	60	0.90
CNC80 1	2.46	583	0.056	65	0.94
CNC80 2	2.62	589	0.062	67	1.04
CNC100 1	0.27	539	0.004	47	0.07
CNC100 2	0.06	446	0.001	38	0.01

(c) Day 14	J_{sc} [mA/cm ²]	V_{oc} [mV]	P_{max} [mW]	FF [%]	η [%]
Ref (L) 1	1.78	585	0.044	69	0.72
Ref (L) 2	2.67	557	0.065	74	1.09
CNC0 1	0.13	711	0.003	54	0.05
CNC0 2	0.17	665	0.003	46	0.05
CNC5 1	1.55	484	0.011	24	0.18
CNC5 2	1.71	500	0.013	26	0.22
CNC10 1	1.88	495	0.014	25	0.23
CNC10 2	2.49	520	0.022	28	0.37
CNC20 1	2.51	532	0.029	36	0.48
CNC20 2	2.36	529	0.027	36	0.45
CNC40 1	1.95	575	0.045	67	0.75
CNC40 2	2.07	577	0.047	66	0.79
CNC60 1	2.63	577	0.056	62	0.94
CNC60 2	2.59	575	0.054	60	0.90
CNC80 1	2.32	586	0.053	65	0.89
CNC80 2	2.52	591	0.060	67	1.00

(d) Day 21	J_{sc} [mA/cm ²]	V_{oc} [mV]	P_{max} [mW]	FF [%]	η [%]
Ref (L) 1	1.57	594	0.039	70	0.65
Ref (L) 2	2.66	554	0.064	71	1.05
CNC0 1	0.14	730	0.003	48	0.05
CNC0 2	0.17	678	0.003	49	0.06
CNC5 1	1.35	495	0.009	23	0.15
CNC5 2	1.73	487	0.014	28	0.23
CNC10 1	1.90	500	0.014	24	0.23
CNC10 2	2.46	513	0.022	29	0.37
CNC20 1	2.50	537	0.030	38	0.51
CNC20 2	2.54	524	0.033	40	0.54
CNC40 1	1.79	578	0.042	68	0.70
CNC40 2	2.00	571	0.046	66	0.76
CNC60 1	2.53	572	0.058	67	0.96
CNC60 2	2.53	578	0.050	57	0.84
CNC80 1	2.44	587	0.056	65	0.93
CNC80 2	2.43	582	0.061	72	1.02

(e) Day 28	J_{sc} [mA/cm ²]	V_{oc} [mV]	P_{max} [mW]	FF [%]	η [%]
Ref (L) 1	1.13	574	0.026	66	0.43
Ref (L) 2	2.58	571	0.064	72	1.06
CNC0 1	0.14	705	0.003	53	0.05
CNC0 2	0.11	707	0.002	48	0.04
CNC5 1	1.46	491	0.010	23	0.17
CNC5 2	1.83	479	0.014	27	0.24
CNC10 1	1.99	491	0.015	25	0.25
CNC10 2	2.47	519	0.022	29	0.37
CNC20 1	2.34	532	0.029	38	0.47
CNC20 2	2.30	530	0.028	39	0.48
CNC40 1	1.70	577	0.039	66	0.65
CNC40 2	1.96	575	0.045	67	0.76
CNC60 1	2.49	574	0.057	66	0.94
CNC60 2	2.31	582	0.052	64	0.86
CNC80 1	2.21	582	0.052	67	0.86
CNC80 2	2.29	590	0.057	70	0.95

(f) Day 60	J_{sc} [mA/cm ²]	V_{oc} [mV]	P_{max} [mW]	FF [%]	η [%]
Ref (L) 1	1.11	566	0.026	61	0.40
Ref (L) 2	1.82	565	0.043	69	0.71
CNC0 1	0.13	693	0.003	54	0.05
CNC0 2	0.13	680	0.003	51	0.05
CNC5 1	1.41	485	0.010	23	0.15
CNC5 2	1.64	483	0.013	28	0.22
CNC10 1	1.92	486	0.015	26	0.23
CNC10 2	2.49	522	0.023	29	0.37
CNC20 1	2.36	522	0.029	38	0.52
CNC20 2	2.39	531	0.032	42	0.53
CNC40 1	1.66	573	0.039	66	0.64
CNC40 2	1.80	576	0.040	64	0.66
CNC60 1	2.06	583	0.048	66	0.80
CNC60 2	2.21	589	0.051	65	0.84
CNC80 1	2.05	582	0.049	67	0.80
CNC80 2	2.20	593	0.055	70	0.91

Table S2. Nyquist and Bode plots measured at a light intensity of 22.0 mW cm^{-2} . EIS measurements are carried out 3 days after DSSC assembly.





