Electronic Supplementary Material (ESI) for Green Chemistry.

Approaching truly sustainable solar cells by the use of water and cellulose derivatives

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SUPPORTING INFORMATION

Table S1 – Ionic conductivity at ambient temperature of gel electrolytes containing NaI 0.50 M and different amount of CMC.

CMC (wt%)	Run	*Z* (Ω)	*σ* (S cm^{-1})	CMC (wt%)	Run	*Z* (Ω)	*σ* (S cm^{-1})
3	1	0.63	1.03×10^{-2}	12.5	1	0.67	9.70×10^{-3}
	2	0.5	1.30×10^{-2}		2	0.62	1.05×10^{-2}
5	1	0.75	8.66×10^{-3}	15	1	0.56	1.16×10^{-2}
	2	0.55	1.18×10^{-2}		2	0.65	9.99×10^{-3}
7.5	1	0.55	1.18×10^{-2}	20	1	0.6	1.08×10^{-2}
	2	0.64	1.02×10^{-2}		2	0.5	1.30×10^{-2}
10	1	0.58	1.12×10^{-2}	10*	1	0.81	8.02×10^{-3}
	2	0.51	1.27×10^{-2}				

* Blank sample containing CMC 10 wt% in deionized water without NaI.

Table S2 – Ionic conductivity at different temperatures of gel electrolytes containing NaI 0.50 M and different amounts of CMC.						
T **(°C)**	**CMC 5 wt%**		**CMC 10 wt%**		**CMC 20 wt%**	
	Z **(Ω)**	***σ*** **(S cm^{-1})**	***Z*** **(Ω)**	***σ*** **(S cm^{-1})**	***Z*** **(Ω)**	***σ*** **(S cm^{-1})**
70	0.54	1.20×10^{-2}	0.49	1.33×10^{-2}	0.57	1.14×10^{-2}
60	0.59	1.10×10^{-2}	0.56	1.16×10^{-2}	0.57	1.14×10^{-2}
50	0.66	9.84×10^{-3}	0.59	1.10×10^{-2}	0.58	1.12×10^{-2}
40	0.65	9.99×10^{-3}	0.59	1.10×10^{-2}	0.59	1.10×10^{-2}
30	0.67	9.70×10^{-3}	0.59	1.10×10^{-2}	0.62	1.05×10^{-2}
20	0.65	9.99×10^{-3}	0.62	1.05×10^{-2}	0.64	1.02×10^{-2}
10	0.71	9.15×10^{-3}	0.68	9.55×10^{-3}	0.67	9.70×10^{-3}
5	0.78	8.33×10^{-3}	0.73	8.90×10^{-3}	0.77	8.44×10^{-3}
–10	0.93	6.99×10^{-3}	0.88	7.38×10^{-3}	0.95	6.84×10^{-3}
–25	12	5.41×10^{-4}	17.8	3.65×10^{-4}	1834.9	3.54×10^{-6}

Table S3 – Best performances of aqueous DSSCs at different CMC levels corresponding to data points in Fig. 4.

CMC (wt%)	Sample		Day		V_{oc} (V)		J_{sc} (mA cm^{-2})		FF (%)		PCE (%)	
	Na	**K**	**Na**	**K**	**Na**	**K**	**Na**	**K**	**Na**	**K**	**Na**	**K**
3.5	Na35B	K35A	6	6	0.356	0.474	0.53	2.28	51	62	0.1	0.67
4.5	Na45A	K45A	6	0	0.439	0.456	1.98	2.21	60	63	0.52	0.63
5.5	Na55A	K55B	0	0	0.437	0.453	2.33	2.61	60	61	0.61	0.72
6.5		K65A		1		0.467		2.33		61		0.66
7.5	Na75A	K75B	6	0	0.433	0.448	1.76	2.15	59	61	0.45	0.59
0	B2*	K55A**	2	12	0.543	0.488	2.10	2.70	60	62	0.68	0.81
0	B1*	K55B**	2	12	0.536	0.450	1.20	2.78	58	59	0.37	0.74

* Liquid NaI 4.5 M + I_2 50 mM

** Liquid KI 5.5 M + I_2 50 mM

Table S4 – Evolution of photovoltaic parameters of aqueous DSSCs sensitized with D131:CDCA = 1:1.18 and filled with NaI 4.50 M, I_2 50 mM and CMC 3.5 wt% (cell Na35A) or KI 5.50 M, I_2 50 mM and CMC 3.5 wt% (cell K35B) stored at RT under dark condition.											
Na35A						**K35B**					
Time (d)	**Run**	**V_{oc} (mV)**	**J_{sc} (mA cm^{-2})**	**FF (%)**	**PCE (%)**	**Time (d)**	**Run**	**V_{oc} (mV)**	**J_{sc} (mA cm^{-2})**	**FF (%)**	**PCE (%)**
0	**1**	363	0.45	51	0.08	**0**	**1**	314	0.32	42	0.04
	2	356	0.44	50	0.08		**2**	313	0.30	44	0.04
	3	353	0.45	50	0.08		**3**	313	0.30	44	0.04
6	**1**	364	0.59	48	0.10	**6**	**1**	358	0.52	46	0.09
	2	345	0.59	44	0.09		**2**	356	0.56	47	0.09
	3	337	0.58	41	0.08		**3**	357	0.57	48	0.10
13	**1**	394	0.73	56	0.16	**13**	**1**	376	0.80	47	0.14
	2	385	0.74	56	0.16		**2**	369	0.81	47	0.14
	3	382	0.75	56	0.16		**3**	370	0.82	48	0.14
20	**1**	390	0.76	56	0.17	**20**	**1**	390	1.04	49	0.20
	2	386	0.77	56	0.17		**2**	391	1.05	50	0.20
	3	382	0.78	56	0.17		**3**	391	1.05	50	0.21
29	**1**	388	0.80	57	0.18	**28**	**1**	428	1.30	60	0.33
	2	383	0.81	57	0.18		**2**	432	1.29	60	0.33
	3	376	0.82	56	0.17		**3**	432	1.27	59	0.32

Table S5 – Evolution of photovoltaic parameters of aqueous DSSCs sensitized with D131:CDCA = 1:1.18 and filled with NaI 4.50 M, I_2 50 mM and CMC 3.5 wt% (cell Na35B) or KI 5.50 M, I_2 50 mM and CMC 3.5 wt% (cell K35B) stored at 60 °C under dark conditions after 6 days of storage at RT.

Na35B							K35A						
Time (d)	**Run**	V_{oc} **(mV)**	J_{sc} **(mA cm^{-2})**	**FF (%)**	**PCE (%)**	**Time @60 °C (d)**	**Time (d)**	**Run**	V_{oc} **(mV)**	J_{sc} **(mA cm^{-2})**	**FF (%)**	**PCE (%)**	**Time @60 °C (d)**
0	**1**	348	0.40	49	0.07	**0**	**0**	**1**	429	1.19	62	0.32	**0**
	2	341	0.40	48	0.07			**2**	426	1.18	62	0.31	
	3	340	0.41	48	0.07			**3**	423	1.19	62	0.31	
6	**1**	369	0.53	51	0.10	**0**	**1**	**1**	440	1.14	63	0.32	**0**
	2	360	0.53	51	0.10			**2**	436	1.13	63	0.31	
	3	356	0.53	51	0.10			**3**	432	1.12	63	0.30	
7	**1***	305	1.11	43	0.15	**1**	**6**	**1**	481	2.28	62	0.68	**0**
	2*	324	1.12	44	0.16			**2**					
	3*	333	1.13	44	0.17			**3**	474	2.28	62	0.67	
8	**1**	393	1.12	47	0.21	**1**	**7**	**1***	383	1.57	57	0.34	**1**
	2	389	1.13	47	0.21			**2***	401	1.64	59	0.39	
	3	386	1.13	46	0.20			**3***	409	1.68	59	0.41	
13	**1***	263	0.35	46	0.04	**6**	**8**	**1**	475	1.90	63	0.57	**1**
	2*	282	0.36	48	0.05			**2**	472	1.89	63	0.56	
	3*	289	0.37	49	0.05			**3**	468	1.89	63	0.55	
14	**1**	399	1.35	51	0.27	**6**	**13**	**1***	379	1.28	57	0.28	**6**
	2	396	1.36	51	0.27			**2***	397	1.33	59	0.31	
	3	391	1.37	51	0.27			**3***	404	1.35	59	0.32	
20	**1***	264	0.29	46	0.04	**12**	**14**	**1**	470	1.54	63	0.45	**6**
	2*	280	0.30	48	0.04			**2**	464	1.53	63	0.44	
	3*	287	0.30	48	0.04			**3**	461	1.51	62	0.43	
21	**1**	389	1.19	50	0.23	**12**	**20**	**1***	366	1.03	56	0.21	**12**
	2	387	1.19	50	0.23			**2***	387	1.07	57	0.24	
	3	384	1.19	50	0.23			**3***	395	1.08	58	0.25	

29	**1**	377	1.02	46	0.18	**20**	**21**	**1**	453	1.22	61	0.33	**12**
	2	375	1.01	46	0.17			**2**	449	1.18	61	0.32	
	3	373	1.01	46	0.17			**3**	446	1.16	61	0.31	
							28	**1***	371	0.90	54	0.18	**19**
								2*	386	0.91	55	0.19	
								3*	392	0.91	55	0.20	
							29	**1**	499	1.79	62	0.55	**19**
								2	495	1.77	61	0.54	
								3	491	1.74	61	0.52	
							36	**1**	445	1.04	59	0.27	**19**
								2	440	1.01	59	0.26	
								3	438	0.99	59	0.25	

* measured at ~60 °C

Table S6 – Evolution of photovoltaic parameters of aqueous DSSCs sensitized with D131:CDCA = 1:1.18 and filled with NaI 4.50 M, I_2 50 mM and CMC 4.5 wt% (cell Na45A) or KI 5.50 M, I_2 50 mM and CMC 4.5 wt% (cell K45B) stored at RT under dark conditions.											
Na45A						**K45B**					
Time (d)	**Run**	**V_{oc} (mV)**	**J_{sc} (mA cm^{-2})**	**FF (%)**	**PCE (%)**	**Time (d)**	**Run**	**V_{oc} (mV)**	**J_{sc} (mA cm^{-2})**	**FF (%)**	**PCE (%)**
0	**1**	427	1.38	56	0.33	**0**	**1**	326	0.32	43	0.04
	2	421	1.40	56	0.33		**2**	328	0.33	44	0.05
	3	418	1.42	55	0.33		**3**	333	0.35	46	0.05
6	**1**	443	1.92	59	0.51	**6**	**1**	394	0.72	49	0.14
	2	442	1.96	60	0.52		**2**	389	0.77	50	0.15
	3	439	1.98	60	0.52		**3**	387	0.79	50	0.15
13	**1**	440	1.84	59	0.48	**13**	**1**	406	1.09	51	0.23
	2	438	1.91	60	0.50		**2**	405	1.09	52	0.23
	3	434	1.92	60	0.50		**3**	401	1.07	52	0.23
20	**1**	441	1.88	60	0.49	**20**	**1**	429	1.33	58	0.33
	2	439	1.91	61	0.51		**2**	428	1.33	59	0.34
	3	435	1.93	61	0.51		**3**	425	1.33	59	0.33
29	**1**	436	1.89	60	0.49	**28**	**1**	408	1.17	51	0.25
	2	433	1.93	61	0.51		**2**	405	1.18	52	0.25
	3	431	1.94	61	0.51		**3**	405	1.19	52	0.25

Table S7 – Evolution of photovoltaic parameters of aqueous DSSCs sensitized with D131:CDCA = 1:1.18 and filled with NaI 4.50 M, I_2 50 mM and CMC 4.5 wt% (cell Na45B) or KI 5.50 M, I_2 50 mM and CMC 4.5 wt% (cell K45A) stored at 60 °C under dark conditions after 6 days of storage at RT.

Na45B							K45A						
Time (d)	**Run**	V_{oc} **(mV)**	J_{sc} **(mA cm^{-2})**	**FF (%)**	**PCE (%)**	**Time @60 °C (d)**	**Time (d)**	**Run**	V_{oc} **(mV)**	J_{sc} **(mA cm^{-2})**	**FF (%)**	**PCE (%)**	**Time @60 °C (d)**
0	**1**	409	1.28	57	0.30	**0**	**0**	**1**	465	2.23	63	0.65	**0**
	2	404	1.30	56	0.29			**2**	460	2.22	63	0.64	
	3	400	1.30	55	0.29			**3**	456	2.21	63	0.63	
6	**1**	421	1.68	60	0.42	**0**	**1**	**1**	443	1.13	63	0.32	**0**
	2	419	1.71	60	0.43			**2**	439	1.13	63	0.31	
	3	416	1.72	60	0.43			**3**	437	1.13	63	0.31	
7	**1***	353	2.22	58	0.45	**1**	**6**	**1**	475	1.97	63	0.59	**0**
	2*	369	2.29	59	0.50			**2**	469	1.97	63	0.58	
	3*	379	2.34	60	0.53			**3**	390	1.26	58	0.29	
8	**1**	435	2.48	62	0.67	**1**	**7**	**1***	405	1.32	60	0.32	**1**
	2	431	2.48	62	0.66			**2***	412	1.35	61	0.34	
	3	428	2.47	62	0.65			**3***	473	1.52	63	0.46	
13	**1***	362	1.63	57	0.33	**6**	**8**	**1**	470	1.51	64	0.45	**1**
	2*	371	1.67	57	0.35			**2**	465	1.51	63	0.44	
	3*	376	1.69	58	0.37			**3**	386	1.06	58	0.24	
14	**1**	426	1.74	60	0.45	**6**	**13**	**1***	399	1.09	59	0.26	**6**
	2	421	1.74	60	0.44			**2***	407	1.11	60	0.27	
	3	417	1.73	60	0.43			**3***	472	1.25	64	0.38	
20	**1***	355	1.32	55	0.26	**12**	**14**	**1**	469	1.23	63	0.37	**6**
	2*	362	1.34	56	0.27			**2**	465	1.23	63	0.36	
	3*	367	1.35	56	0.28			**3**	381	0.88	57	0.19	
21	**1**	421	1.45	58	0.36	**12**	**20**	**1***	395	0.89	58	0.20	**12**
	2	415	1.43	58	0.34			**2***	401	0.90	58	0.21	
	3	410	1.41	58	0.34			**3***	459	1.02	62	0.29	

	1	409	1.21	56	0.28			**1**	455	0.99	62	0.28	
29	**2**	404	1.19	55	0.27	**20**	**21**	**2**	451	0.97	62	0.27	**12**
	3	400	1.18	55	0.26			**3**	384	0.80	57	0.17	
								1*	397	0.81	57	0.18	
							28	**2***	403	0.81	58	0.19	**19**
								3*	451	0.90	60	0.24	
								1	450	0.88	60	0.24	
							29	**2**	447	0.87	60	0.23	**19**
								3	451	0.88	60	0.24	
								1	449	0.86	60	0.23	
							36	**2**	446	0.85	60	0.23	**19**
								3	469	1.23	63	0.37	

* measured at ~60 °C

Table S8 – Evolution of photovoltaic parameters of aqueous DSSCs sensitized with D131:CDCA = 1:1.18 and filled with NaI 4.50 M, I_2 50 mM and CMC 5.5 wt% (cell Na55A) or KI 5.50 M, I_2 50 mM and CMC 5.5 wt% (cell K45B) stored at RT under dark conditions.											
Na55A						**K45B**					
Time (d)	**Run**	**V_{oc} (mV)**	**J_{sc} (mA cm^{-2})**	**FF (%)**	**PCE (%)**	**Time (d)**	**Run**	**V_{oc} (mV)**	**J_{sc} (mA cm^{-2})**	**FF (%)**	**PCE (%)**
0	**1**	443	2.30	59	0.60	**0**	**1**	461	2.60	60	0.73
	2	440	2.32	60	0.61		**2**	458	2.61	61	0.72
	3	437	2.33	60	0.61		**3**	453	2.61	61	0.72
6	**1**	442	2.17	60	0.58	**1**	**1**	458	2.31	60	0.63
	2	441	2.19	61	0.59		**2**	456	2.32	61	0.64
	3	438	2.20	61	0.59		**3**	453	2.34	61	0.64
13	**1**	430	1.58	59	0.40	**6**	**1**	449	1.87	59	0.50
	2	427	1.61	59	0.41		**2**	448	1.90	60	0.51
	3	424	1.63	59	0.41		**3**	446	1.91	61	0.52
20	**1**	438	2.04	61	0.54	**13**	**1**	438	1.64	59	0.42
	2	436	2.06	61	0.55		**2**	438	1.68	60	0.44
	3	432	2.08	61	0.55		**3**	436	1.70	60	0.45
29	**1**	441	2.13	61	0.58	**20**	**1**	430	1.48	58	0.37
	2	435	2.14	61	0.57		**2**	429	1.50	59	0.38
	3	431	2.14	62	0.57		**3**	427	1.52	60	0.39
						28	**1**	431	1.39	58	0.35
							2	431	1.42	59	0.36
							3	428	1.44	60	0.37
						36	**1**	428	1.36	58	0.34
							2	429	1.39	59	0.35
							3	427	1.40	60	0.36

Table S9 – Evolution of photovoltaic parameters of aqueous DSSCs sensitized with D131:CDCA = 1:1.18 and filled with NaI 4.50 M, I_2 50 mM and CMC 5.5 wt% (cell Na55B) or KI 5.50 M, I_2 50 mM and CMC 5.5 wt% (cell K55A) stored at 60 °C under dark condition after 6 days of storage at ambient temperature.

Na55B							K55A						
Time (d)	**Run**	V_{oc} **(mV)**	J_{sc} **(mA cm^{-2})**	**FF (%)**	**PCE (%)**	**Time @60 °C (d)**	**Time (d)**	**Run**	V_{oc} **(mV)**	J_{sc} **(mA cm^{-2})**	**FF (%)**	**PCE (%)**	**Time @60 °C (d)**
0	**1**	445	2.10	58	0.56	**0**	**0**	**1**	452	2.13	57	0.55	**0**
	2	442	2.12	59	0.55			**2**	449	2.13	57	0.55	
	3	438	2.14	59	0.55			**3**	445	2.12	57	0.54	
6	**1**	439	1.90	59	0.49	**0**	**1**	**1**	448	2.12	57	0.54	**0**
	2	437	1.92	60	0.50			**2**	448	2.15	58	0.56	
	3	435	1.93	60	0.50			**3**	447	2.16	58	0.56	
7	**1***	388	2.10	58	0.48	**1**	**6**	**1**	437	1.65	55	0.40	**0**
	2*	404	2.18	59	0.52			**2**	438	1.68	57	0.42	
	3*	412	2.22	59	0.54			**3**	436	1.70	58	0.43	
8	**1**	455	2.60	62	0.74	**1**	**7**	**1***	362	1.40	55	0.28	**1**
	2	451	2.60	62	0.73			**2***	380	1.49	58	0.33	
	3	447	2.59	62	0.72			**3***	389	1.55	59	0.35	
13	**1***	382	1.77	59	0.40	**6**	**8**	**1**	447	1.72	60	0.46	**1**
	2*	391	1.79	59	0.41			**2**	446	1.73	61	0.47	
	3*	397	1.81	59	0.42			**3**	443	1.72	61	0.47	
14	**1**	450	1.93	62	0.54	**6**	**13**	**1***	400	1.81	57	0.41	**6**
	2	445	1.91	61	0.52			**2***	416	1.89	59	0.46	
	3	441	1.90	61	0.51			**3***	424	1.93	60	0.49	
20	**1***	381	1.49	58	0.33	**12**	**14**	**1**	494	2.18	62	0.67	**6**
	2*	389	1.49	58	0.34			**2**	490	2.15	62	0.66	
	3*	394	1.50	58	0.34			**3**	486	2.14	62	0.64	
21	**1**	372	0.38	59	0.08	**12**	**20**	**1***	396	1.59	57	0.36	**12**
	2	368	0.37	59	0.08			**2***	415	1.65	58	0.40	
	3	364	0.37	59	0.08			**3***	424	1.69	59	0.42	

29	**1**	434	1.40	56	0.34	**20**	**21**	**1**	494	1.94	61	0.58	**12**
	2	430	1.36	55	0.32			**2**	490	1.92	61	0.57	
	3	428	1.35	55	0.32			**3**	485	1.90	61	0.56	
							28	**1***	415	1.55	57	0.36	**19**
								2*	432	1.60	58	0.40	
								3*	437	1.62	58	0.41	
							29	**1**	488	1.77	59	0.51	**19**
								2	487	1.75	59	0.50	
								3	483	1.73	59	0.49	
							36	**1**	490	1.76	59	0.50	**19**
								2	488	1.74	58	0.49	
								3	484	1.73	58	0.49	

* measured at ~60 °C

Table S10 – Evolution of photovoltaic parameters of aqueous DSSCs sensitized with D131:CDCA = 1:1.18 and filled with KI 5.50 M, I_2 50 mM and CMC 6.5 wt% (cell K65B) stored at RT under dark conditions.					
K65B					
Time (d)	**Run**	**V_{oc} (mV)**	**J_{sc} (mA cm^{-2})**	**FF (%)**	**PCE (%)**
0	**1**	461	2.08	57	0.55
	2	452	2.09	56	0.53
	3	447	2.09	56	0.53
1	**1**	470	2.17	60	0.61
	2	464	2.16	60	0.60
	3	459	2.16	60	0.59
6	**1**	464	2.02	60	0.56
	2	462	2.04	60	0.57
	3	459	2.04	60	0.57
13	**1**	469	1.93	60	0.55
	2	466	1.94	61	0.55
	3	462	1.95	61	0.55
20	**1**	467	1.86	60	0.52
	2	463	1.87	61	0.52
	3	459	1.87	60	0.52
28	**1**	466	1.80	60	0.50
	2	464	1.82	61	0.51
	3	461	1.82	61	0.51
36	**1**	471	1.76	60	0.50
	2	466	1.77	61	0.50
	3	462	1.77	61	0.50

Table S11 – Evolution of photovoltaic parameters of aqueous DSSCs sensitized with D131:CDCA = 1:1.18 and filled with KI 5.50 M, I_2 50 mM and CMC 6.5 wt% (cell K65A) stored at 60 °C under dark condition after 6 days of storage at ambient temperature.

K65A						
Time (d)	**Run**	V_{oc} **(mV)**	J_{sc} **(mA cm^{-2})**	**FF (%)**	**PCE (%)**	**Time @60 °C (d)**
0	**1**	470	2.13	60	0.60	**0**
	2	457	2.11	59	0.57	
	3	451	2.11	59	0.56	
1	**1**	475	2.34	61	0.67	**0**
	2	470	2.33	61	0.67	
	3	467	2.33	61	0.66	
6	**1**	475	2.16	61	0.63	**0**
	2	472	2.16	61	0.63	
	3	469	2.17	61	0.62	
7	**1***	401	1.83	59	0.43	**1**
	2*	414	1.90	61	0.48	
	3*	421	1.95	61	0.50	
8	**1**	413	1.85	59	0.45	**1**
	2	426	1.90	60	0.48	
	3	434	1.94	61	0.51	
13	**1***	481	2.14	63	0.65	**6**
	2*	478	2.14	64	0.65	
	3*	474	2.13	63	0.64	
14	**1**	505	2.18	64	0.70	**6**
	2	498	2.16	64	0.69	
	3	495	2.15	64	0.68	
20	**1***	429	1.68	60	0.43	**12**
	2*	440	1.71	60	0.45	
	3*	444	1.73	60	0.46	
21	**1**	499	1.94	63	0.61	**12**
	2	495	1.91	62	0.59	
	3	488	1.90	62	0.58	
28	**1***	420	1.56	59	0.39	**19**
	2*	420	1.56	59	0.39	
	3*	439	1.61	60	0.42	
29	**1**	487	1.76	61	0.53	**19**
	2	484	1.73	61	0.51	
	3	481	1.72	61	0.50	
36	**1**	495	1.74	62	0.53	**19**
	2	491	1.71	61	0.51	
	3	486	1.69	61	0.50	

* measured at ~60 °C

Table S12 – Evolution of photovoltaic parameters of aqueous DSSCs sensitized with D131:CDCA = 1:1.18 and filled with NaI 4.50 M, I_2 50 mM and CMC 7.5 wt% (cell Na75A) or KI 5.50 M, I_2 50 mM and CMC 7.5 wt% (cell K75B) stored at ambient temperature under dark condition.

Na75A						K75B					
Time (d)	**Run**	**V_{oc} (mV)**	**J_{sc} (mA cm^{-2})**	**FF (%)**	**PCE (%)**	**Time (d)**	**Run**	**V_{oc} (mV)**	**J_{sc} (mA cm^{-2})**	**FF (%)**	**PCE (%)**
0	**1**	420	1.52	53	0.34	**0**	**1**	456	2.13	61	0.59
	2	420	1.54	53	0.34		**2**	452	2.14	61	0.59
	3	419	1.55	54	0.35		**3**	448	2.15	61	0.59
6	**1**	437	1.73	59	0.44	**1**	**1**	459	1.88	61	0.53
	2	438	1.75	59	0.45		**2**	455	1.89	61	0.53
	3	433	1.76	59	0.45		**3**	451	1.89	61	0.52
13	**1**	439	2.07	60	0.55	**6**	**1**	437	1.51	59	0.39
	2	437	2.10	61	0.56		**2**	437	1.54	60	0.41
	3	434	2.12	61	0.56		**3**	435	1.55	61	0.41
20	**1**	422	1.54	59	0.39	**13**	**1**	440	1.42	59	0.37
	2	418	1.54	60	0.39		**2**	439	1.45	60	0.38
	3	416	1.57	59	0.39		**3**	436	1.46	61	0.39
29	**1**	426	1.55	59	0.39	**20**	**1**	438	1.36	59	0.35
	2	421	1.57	60	0.40		**2**	436	1.40	60	0.37
	3	417	1.58	60	0.39		**3**	432	1.40	61	0.37
						28	**1**	437	1.30	59	0.34
							2	436	1.32	60	0.35
							3	435	1.33	61	0.35
						36	**1**	438	1.25	59	0.33
							2	437	1.28	60	0.34
							3	434	1.30	60	0.34

Table S13 – Evolution of photovoltaic parameters of aqueous DSSCs sensitized with D131:CDCA = 1:1.18 and filled with NaI 4.50 M, I_2 50 mM and CMC 7.5 wt% (cell Na75B) or KI 5.50 M, I_2 50 mM and CMC 7.5 wt% (cell K75A) stored at 60 °C under dark condition after 6 days of storage at ambient temperature.

Na75B							K75A						
Time (d)	**Run**	V_{oc} **(mV)**	J_{sc} **(mA cm⁻²)**	**FF (%)**	**PCE (%)**	**Time @60 °C (d)**	**Time (d)**	**Run**	V_{oc} **(mV)**	J_{sc} **(mA cm⁻²)**	**FF (%)**	**PCE (%)**	**Time @60 °C (d)**
0	**1**	381	0.58	52	0.11	**0**	**0**	**1**	443	2.090	56	0.52	**0**
	2	376	0.60	52	0.12			**2**	418	0.885	57	0.21	
	3	376	0.62	51	0.12			**3**	414	0.889	57	0.21	
6	**1**	430	1.52	59	0.38	**0**	**6**	**1**	421	0.647	60	0.16	**0**
	2	429	1.54	58	0.39			**2**	420	0.655	60	0.17	
	3	427	1.55	58	0.39			**3**	417	0.661	60	0.17	
7	**1***	388	2.10	58	0.48	**1**	**7**	**1***	389	1.28	57	0.29	**1**
	2*	404	2.18	59	0.52			**2***	401	1.34	59	0.32	
	3*	412	2.22	59	0.54			**3***	409	1.38	59	0.34	
8	**1**	470	2.44	62	0.71	**1**	**8**	**1**	392	1.18	59	0.27	**1**
	2	467	2.44	62	0.71			**2**	403	1.22	60	0.29	
	3	463	2.44	62	0.70			**3**	409	1.24	60	0.31	
13	**1***	418	2.03	59	0.50	**6**	**13**	**1***	473	1.56	63	0.46	**6**
	2*	426	2.06	59	0.52			**2***	469	1.56	63	0.46	
	3*	429	2.08	59	0.53			**3***	465	1.56	62	0.45	
14	**1**	475	2.22	61	0.64	**6**	**14**	**1**	477	1.42	63	0.42	**6**
	2	472	2.21	61	0.63			**2**	473	1.40	63	0.41	
	3	469	2.20	60	0.62			**3**	469	1.38	63	0.40	
20	**1***	400	1.74	56	0.39	**12**	**20**	**1***	390	1.04	58	0.24	**12**
	2*	408	1.76	57	0.41			**2***	403	1.07	59	0.25	
	3*	413	1.78	57	0.42			**3***	410	1.08	59	0.26	
21	**1**	461	1.91	57	0.50	**12**	**21**	**1**	466	1.21	61	0.35	**12**
	2	459	1.89	57	0.50			**2**	461	1.16	61	0.33	
	3	456	1.88	57	0.49			**3**	456	1.15	61	0.32	

29	**1**	448	1.66	49	0.37	**19**	**28**	**1***	403	0.93	57	0.21	**19**
	2	445	1.65	50	0.37			**2***	410	0.93	58	0.22	
	3	443	1.64	51	0.37			**3***	415	0.93	58	0.23	
							29	**1**	458	1.05	59	0.28	**19**
								2	453	1.02	59	0.27	
								3	449	1.00	59	0.26	
							36	**1**	458	1.04	59	0.28	**19**
								2	453	1.02	59	0.27	
								3	449	0.99	59	0.26	

* measured at ~60 °C

Table S14 – List of the weak aspects of 100% aqueous electrolytes present in the literature with respect to the hydrogel proposed in this work.							
Components	**J_{sc} (mA cm^{-2})**	**V_{oc} (V)**	**FF**	**PCE (%)**	**PCE loss (%)**	**Ref.**	**Weak points with respect to this work**
NaI 0.10 M and I_2 10 mM	1.92	0.498	0.55	0.529	-	[1]	Not stable. Less efficient.
LiI 0.10 M, I_2 10 mM, 0.5 wt% κ-carrageenan and HNO_3 (pH 2)	2.69	0.442	0.48	0.586	-	[2]	Not stable. Less efficient. Strongly acidic.
KI 0.50 M and I_2 25 mM	2.14	0.44	0.64	0.6	-	[3]	Not stable. Less efficient.
KI 0.50 M and I_2 25 mM	3.61	0.47	0.65	1.1	50% (75 d, dark, RT)	[3]	Not stable.
PMII 2.0 M, I_2 50 mM, GuSCN 0.10 M, TBP 0.50 M and Triton X-100 1%	2.28	0.66	0.79	1.16	-	[4]	Not stable. It contains petroleum-derived and toxic additives. Based on our experience, TBP is not soluble in H_2O [5] .
KI 4.0 M, I_2 20 mM, HNO_3 (pH 4) and BMPP (saturated)	3.97	0.481	0.68	1.34	-	[6]	Not stable.
$[Co(bpy)_3]Cl_2$ 0.13 M, $[Co(bpy)_3]Cl_3$ 40 mM, NMBI 0.80 M	3.4	0.63	0.68	1.4	25% (200 h, 1 sun, RT)	[7]	Less stable. It contains heavy metals and petroleum-derived/toxic additives.
Acrylic acid : Gelatin : $(NH_4)_2S_2O_8$ = 10:1:0.08 polymerized at 80 °C, then swollen in LiI 0.50 M and I_2 50 mM	4.3	0.59	0.71	1.80	20% (2 h, dark)	[8]	Less stable. It requires a thermal treatment.
NaI 2.0 M, I_2 20 mM, GuSCN 0.50 M and CDCA until saturation	4.91	0.62	0.64	1.88	-	[9]	Not stable.
TEMPOL 1.0 M and $NaBF_4$ 1.0 M	4.5	0.69	0.64	2.1	-	[10]	Not stable.
PMII 2.0 M, I_2 50 mM, GuSCN 0.10 M, TBP 0.50 M	3.78	0.68	0.82	2.1	-	[4]	Not stable. It contains petroleum-derived and toxic additives. Based on our

and Triton X-100 1%							experience, TBP is not soluble in H_2O [5].
KI 4.0 M, I_2 20 mM and CDCA until saturation	4.86	0.600	0.76	2.20	-	[11]	Not stable.
PMII 2.0 M, I_2 50 mM, GuSCN 0.10 M, TBP 0.50 M and Triton X-100 1%	4.7	0.74	0.69	2.4	-	[12]	Not stable. It contains petroleum-derived and toxic additives. Based on our experience, TBP is not soluble in H_2O [5].
$TT^{-}EMI^{+}$ 0.20 M, DTT 0.20 M, TBP 0.50 M and 1% Triton X-100	7.2	0.65	0.55	2.6	37% (4 h, 1 sun, RT)	[13]	Not stable. It contains petroleum-derived and toxic additives. Based on our experience, TBP is not soluble in H_2O [5].
NaI 2.0 M, I_2 20 mM, GuSCN 0.50 M and CDCA until saturation	7.34	0.59	0.63	2.64	-	[9]	Not stable.
KI 2.0 M, I_2 10 mM and CDCA until saturation	6.85	0.650	0.67	3.01	-	[11]	Not stable.
NaI 2.0 M, I_2 20 mM, GuSCN 1.0 M, HNO_3 (pH 3) and CDCA until saturation	8.5	0.59	0.63	3.08	-	[9]	Not stable. Strongly acidic.
GuI 8.0 M, I_2 20 mM, CDCA (sat.) and SiO_2 (5 wt%)	8.20	0.75	0.51	3.13	37% (1200 h, outdoor)	[14]	Lower amount of renewable components. Lack of thermal stability test.
$[Co(phen)_3]Cl_2$ 0.13 M, $[Co(phen)_3]Cl_3$ 40 mM, NMBI 0.80 M	6.3	0.75	0.73	3.4	45% (200 h, 1 sun, RT)	[7]	Less stable. It contains heavy metals and petroleum-derived/toxic additives.
$TT^{-}EMI^{+}$ 0.20 M, DTT 0.60 M, TBP 0.50 M and 1% Triton X-100	9.5	0.61	0.59	3.5	-	[13]	Not stable. It contains petroleum-derived and toxic additives.
NaI 2.0 M, I_2 0.20 M, GuSCN 0.10 M and FC-134 0.2 wt%	10.97	0.53	0.68	3.96	63% (50 d, 1 sun, RT, UV filter)	[15]	Less stable.

GuI 8.0 M, I_2 20 mM and CDCA until saturation	10.02	0.61	0.67	4.06	-	[9]	Not stable.
$K_4Fe(CN)_6$ 0.40 M, $K_3Fe(CN)_6$ 40 mM, KCl 0.10 M, Trizma-HCl buffer 50 mM (pH 8) and Tween 20 0.1%	7.2	0.76	0.75	4.1	50% (2 h)	[16]	Not stable.
$[Co(bpy)_3]^{2+}$ 0.20 M, $[Co(bpy)_3]^{3+}$ 40 mM, NMBI 0.70 M, PEG 300 1% and Gelatin 15%	7.9	0.70	0.74	4.1	25% (120 d, dark)	[17]	It contains heavy metals and petroleum-derived/toxic additives.
$[Co(bpy)_3]^{2+}$ 0.20 M, $[Co(bpy)_3]^{3+}$ 40 mM, NMBI 0.70 M and PEG 300 1%	8.3	0.68	0.72	4.2	10% (90 d, dark)	[18]	It contains heavy metals and petroleum-derived/toxic additives.
TEMPO 0.15 M, $TEMPOBF_4$ 50 mM, $LiClO_4$ 0.10 M and NMBI 0.20 M	5.78	0.955	0.75	4.14	-	[19]	Not stable.
$[Co(phen)_3]Cl_2$ 0.13 M, $[Co(phen)_3]Cl_3$ 60 mM, NMBI 0.80 M	8.6	0.75	0.72	4.8	45% (200 h, 1 sun, RT)	[7]	Less stable. It contains heavy metals and petroleum-derived/toxic additives.
TEMPO 0.40 M, $NOBF_4$ 0.40 M, LiI 0.10 M, I_2 50 mM, DMPII 0.60 M, GuSCN 0.10 M and Tween 20 0.1%	9.56	0.77	0.67	4.96	-	[20]	Not stable.
$[Co(bpy)_3]^{2+}$ 0.20 M, $[Co(bpy)_3]^{3+}$ 40 mM, NMBI 0.70 M NMBI and PEG 300 1%	9.8	0.69	0.74	5	Gain 2% (2 d, dark)	[18]	Less stable. It contains heavy metals and petroleum-derived/toxic additives.
$[Co(bpy\text{-}pz)_3]Cl_2$ 0.13 M, $[Co(bpy\text{-}pz)_3]Cl_3$ 60 mM, NMBI 0.80 M	81	0.90	0.76	5.5	-	[7]	Not stable. It contains heavy metals and petroleum-derived/toxic additives.
$[Co(bpy)_3](NO_3)_2$ 0.20 M, $[Co(bpy)_3](NO_3)_3$ 40 mM,	10.17	0.821	0.68	5.64	0% (500 h, dark)	[21]	It contains heavy metals and petroleum-derived/toxic additives.

NMBI 0.70 M and PEG 300 1 wt%							
JC-IL 0.40 M and $NOBF_4$ 0.40 M	9.87	0.88	0.68	5.97	-	[22]	Not stable.

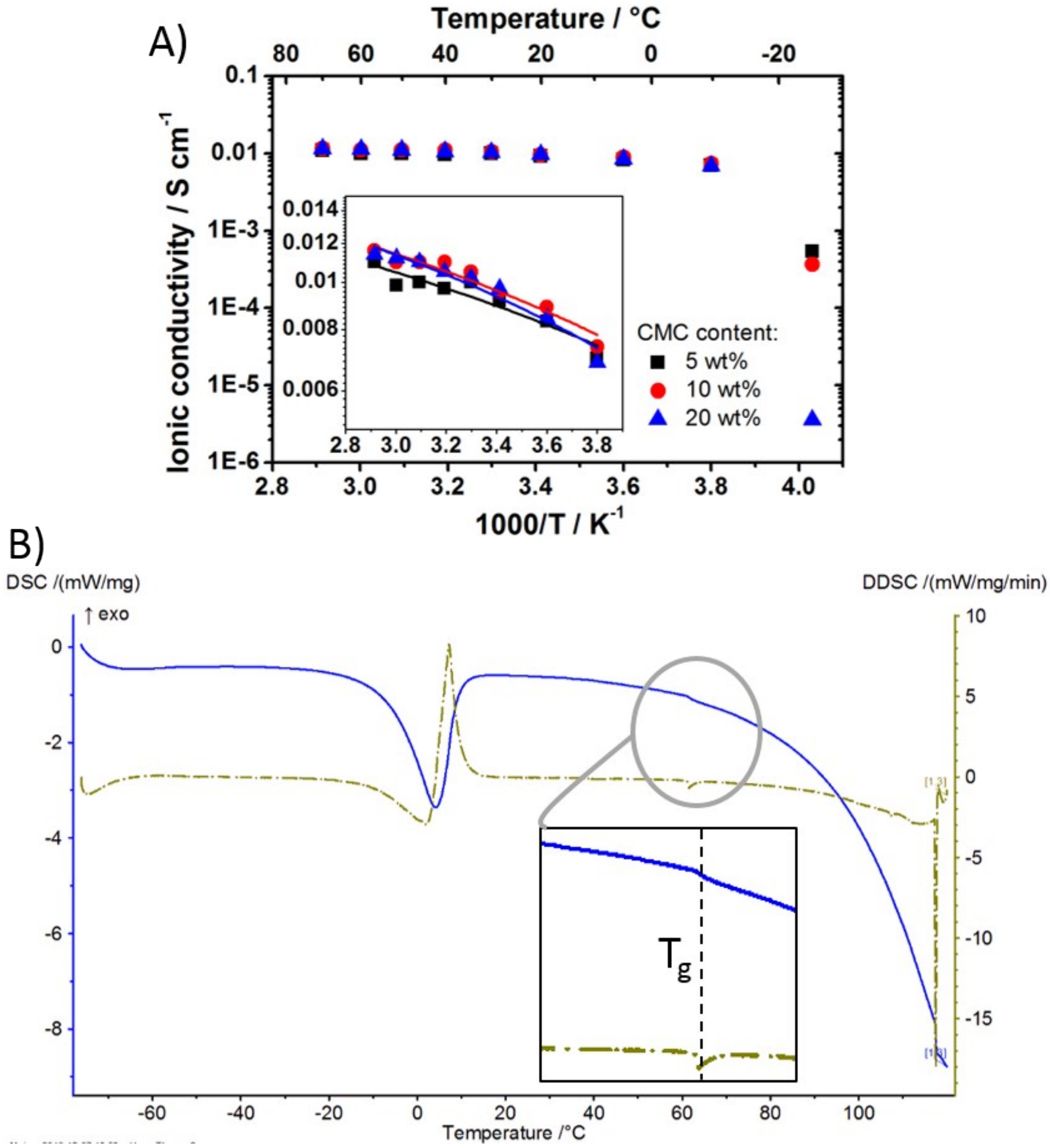

Fig. S1. A) Arrhenius plot showing the ionic conductivity data in the temperature range of –25/+70 °C, for aqueous NaI 0.50 M gels containing different amounts of CMC. The corresponding R^2 values are 0.87 (5 wt%), 0.93 (10 wt%) and 0.95 (20 wt%).; **B)** Differential scanning calorimetry (DSC) trace of the 10 wt% CMC-containing electrolyte: a T_g value equal to +62 °C emerges. The T_g is above the standard operating temperature of DSSCs, therefore we collected almost all ionic conductivity data below the T_g. This means that the VTF behavior cannot be invoked, since it is related to semirandom motion of short polymer segments occurring when electrolytes work in a temperature exceeding the T_g. Thus, we likely attribute the ionic conductivity *vs.* temperature trend to a mixed Arrhenius / Non-Arrhenius behaviour.

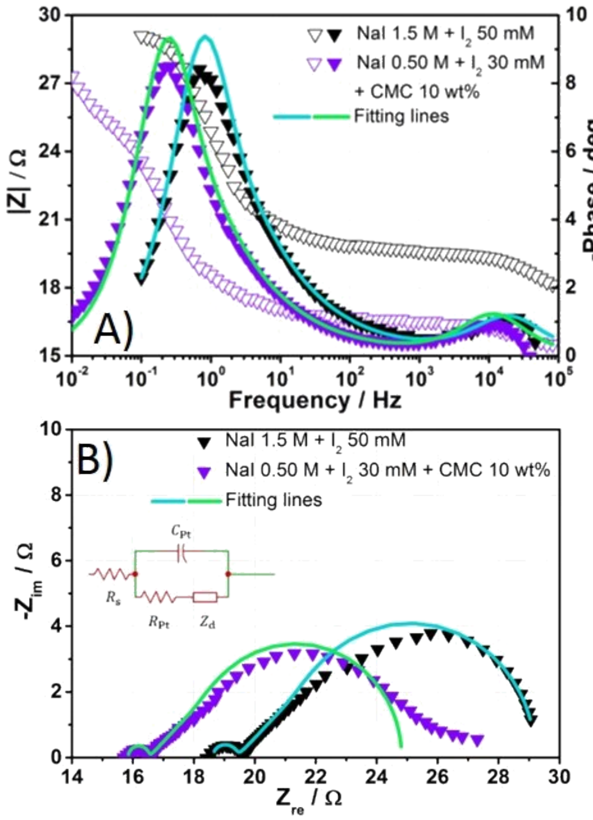

Fig. S2. A) Bode (modulus = open triangles; phase = filled triangles) and **B)** Nyquist plots of a dummy cell filled with aqueous NaI 0.50 M, I_2 30 mM and CMC 10 wt%. The spectra of a dummy cell filled with aqueous NaI 1.5 M + I_2 50 mM are shown for comparison. The spectra were fitted according to Eq. 2 and the equivalent circuit is shown in panel B. according to:

$$Z(\omega) = R_s + \frac{1}{\frac{1}{(R_{ct} + Z_d)} + T_{Pt}(i\omega)^{\varphi_{Pt}}} \qquad \text{(Eq. S1)}$$

where R_S is the series resistance, R_{ct} is the charge transfer resistance at the TiO_2/electrolyte interface, Z_d is the impedance due to ionic diffusion, ω is the frequency of the applied small-amplitude modulated potential, T_{Pt} and φ_{Pt} are the parameters of the constant phase element (CPE) used to describe the double layer capacitance at the Pt/electrolyte interface (C_{Pt}, accounting for the corresponding depressed semicircle in the Nyquist plot)· The constraint $0.90 \leq \varphi_{Pt} \leq 1$ was applied and the double layer capacitance was calculated from the CPE as follows [23]:

$$C_{Pt} = \sqrt[\varphi_{Pt}]{\frac{T_{Pt}}{R_{Pt}^{(\varphi_{Pt}-1)}}} \qquad \text{(Eq. S2)}$$

where R_{Pt} is the AC resistance to charge transfer at the Pt/electrolyte interface.

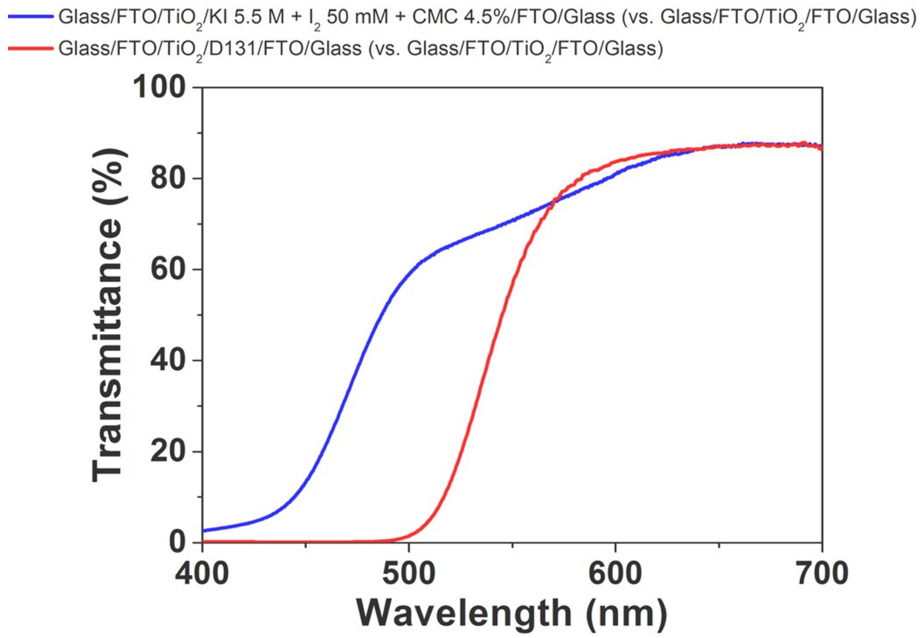

Fig. S3. Transmittance of: i) The hydrogel electrolyte proposed in this work (blue curve); ii) The metal-free sensitizer chosen for DSSCs (red curve). It emerges the typical absorption in the near-UV region due to the iodine-based redox couple, and the absorption at low wavelength typical of a yellow dye as D131. This allows to obtain solar cells with a high transmittance (>70%) above 550 nm, which accounts for their suitability in building-integrated applications.

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