ESI to accompany

Optimization of performance and long-term stability of p-type dye-sensitized solar cells with a cycloruthenated dye through electrolyte solvent tuning

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Abbreviations: AN = acetonitrile; PN = propionitrile; VN = valeronitrile; MPN = 3-methoxypropionitrile.

Table S1. Performance data for duplicate DSCs containing [Ru(bpy)$_2$(**1**)] and I_3^-/I^- redox couple in mixed solvents, using in-house sccreen-printed (Solaronix paste) FTO/NiO electrodes. Data for pure AN, PN, VN and MPN are repeated from Table 5 in the main paper for convenience.

Solvent in electrolyte (ratio by volume)	DSC number	JSC / mA cm–2	VOC / mV	ff / %	η / %
AN[a]	cell 1	3.38	95	36	0.116
AN[a]	cell 2	3.34	95	34	0.109
AN : PN 3 : 1	cell 1	2.86	111	35	0.111
AN : PN 3 : 1	cell 2	2.54	114	35	0.101
AN : PN 1 : 1	cell 1	2.32	105	37	0.091
AN : PN 1 : 1	cell 2	2.77	101	37	0.102
AN : PN 1 : 3	cell 1	2.48	110	38	0.105
AN : PN 1 : 3	cell 2	2.43	114	38	0.105
PN	cell 1	2.18	115	40	0.099
PN	cell 2	2.16	118	39	0.100
AN : VN 3 : 1	cell 1	2.10	114	35	0.084
AN : VN 3 : 1	cell 2	2.04	112	36	0.082
AN : VN 1 : 1	cell 1	1.80	117	37	0.078
AN : VN 1 : 1	cell 2	1.72	119	37	0.075
AN : VN 1 : 3	cell 1	1.24	134	39	0.065
AN : VN 1 : 3	cell 2	1.27	135	35	0.061
VN	cell 1	0.64	149	36	0.033
VN	cell 2	0.64	148	34	0.031
AN : MPN 3 : 1	cell 1	2.22	88	36	0.070
AN : MPN 3 : 1	cell 2	2.34	85	35	0.069
AN : MPN 1 : 1	cell 1	2.05	88	35	0.063
AN : MPN 1 : 1	cell 2	2.15	88	34	0.065
AN : MPN 1 : 3	cell 1	1.65	97	34	0.054
AN : MPN 1 : 3	cell 2	1.70	96	35	0.057
MPN	cell 1	1.48	106	36	0.053
MPN	cell 2	1.47	113	36	0.056

[a]Data from ref. 1.

Reference

1. F. Brunner, N. Marinakis, C. Wobill, M. Willgert, C.D. Ertl, T. Kosmalski, M. Neuburger, B. Bozic-Weber, T. Glatzel, E.C. Constable and C.E. Housecroft, *J. Mater. Chem. C*, 2016, **4**, 9823.

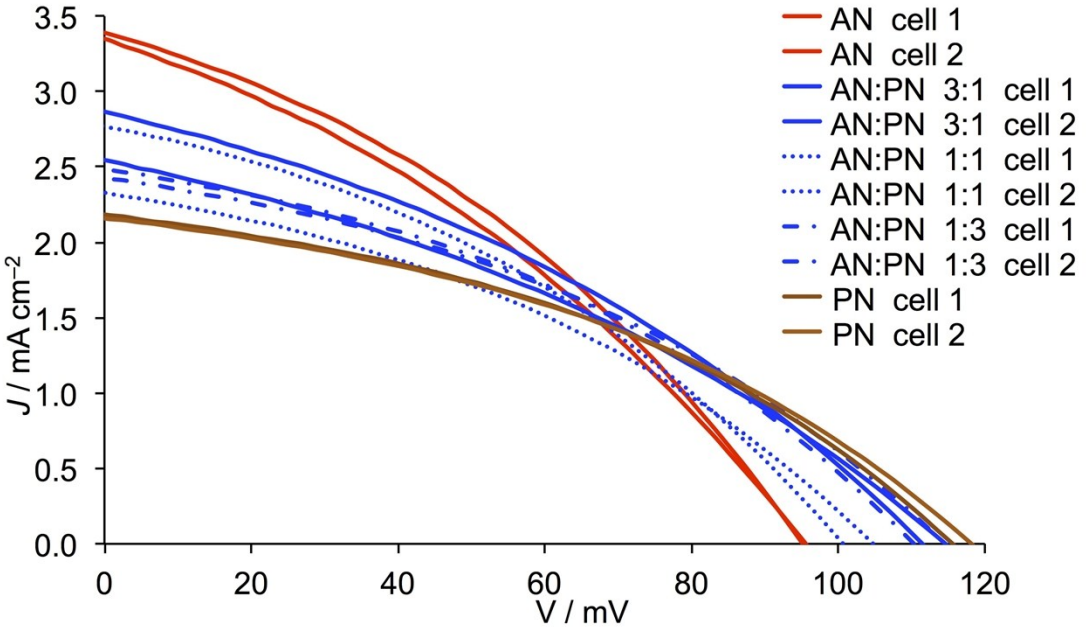

Fig. S1. *J*–*V* curves for duplicate DSCs containing in-house screen-printed (Solaronix paste) FTO/NiO electrodes functionalized with [Ru(bpy)$_2$(H**1**)] and electrolytes comprising I_3^-/I^- in AN, PN or AN:PN mixed solvent. Ratios of solvents are by volume.

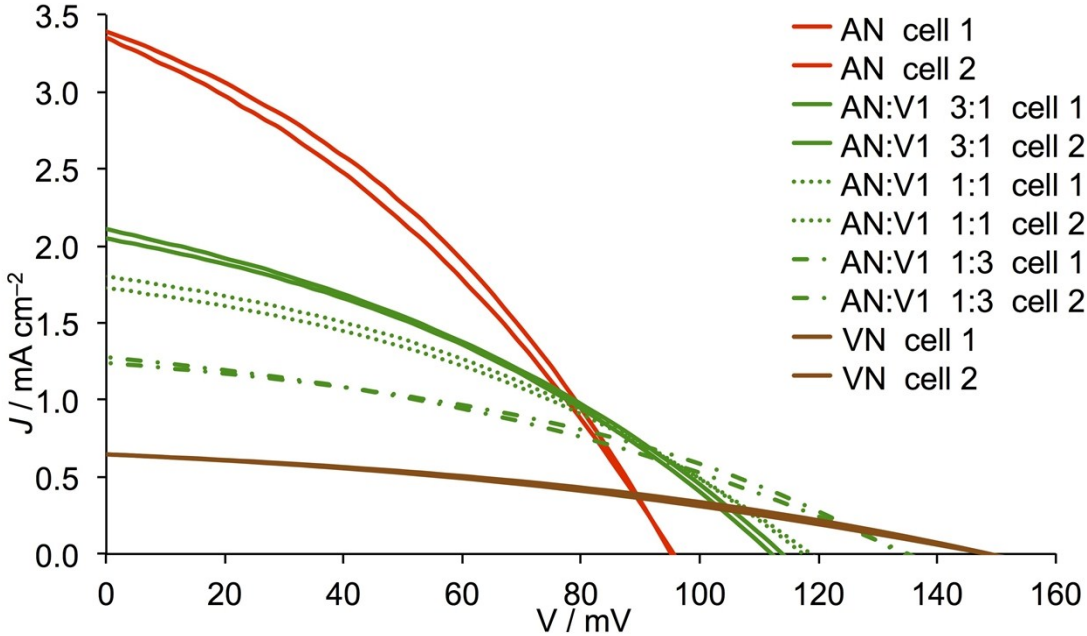

Fig. S2. *J*–*V* curves for duplicate DSCs containing in-house screen-printed (Solaronix paste) FTO/NiO electrodes functionalized with [Ru(bpy)$_2$(H**1**)] and electrolytes comprising I_3^-/I^- in AN, VN or AN:VN mixed solvent. Ratios of solvents are by volume.

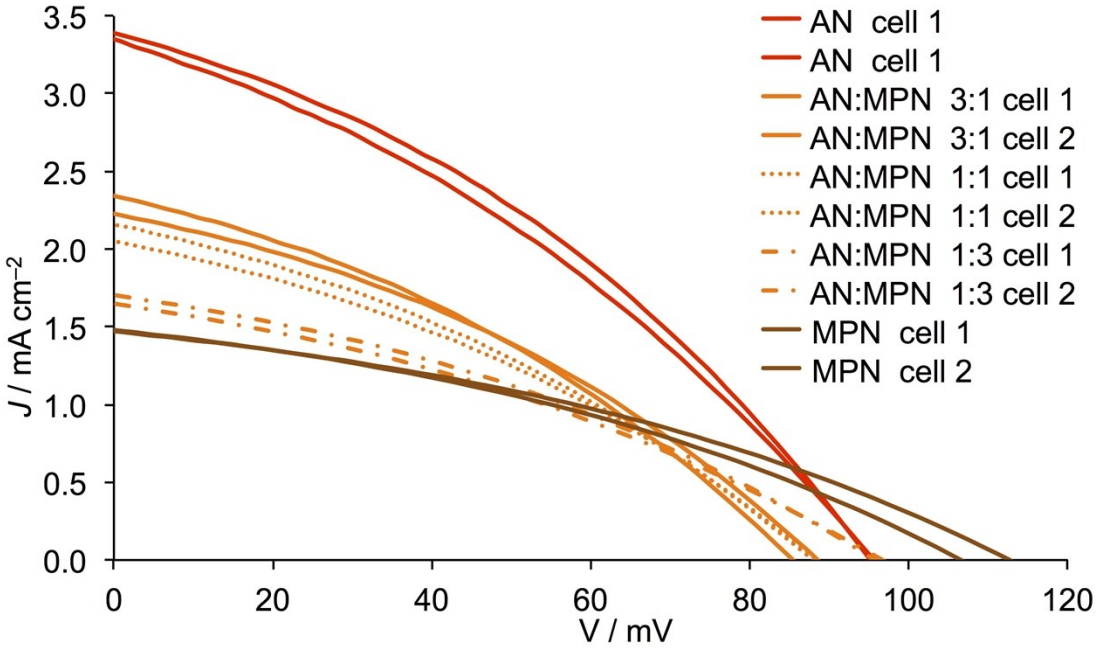

Fig. S3. *J*–*V* curves for duplicate DSCs containing in-house screen-printed (Solaronix paste) FTO/NiO electrodes functionalized with [Ru(bpy)$_2$(H**1**)] and electrolytes comprising I_3^-/I^- in AN, MPN or AN:MPN mixed solvent. Ratios of solvents are by volume.

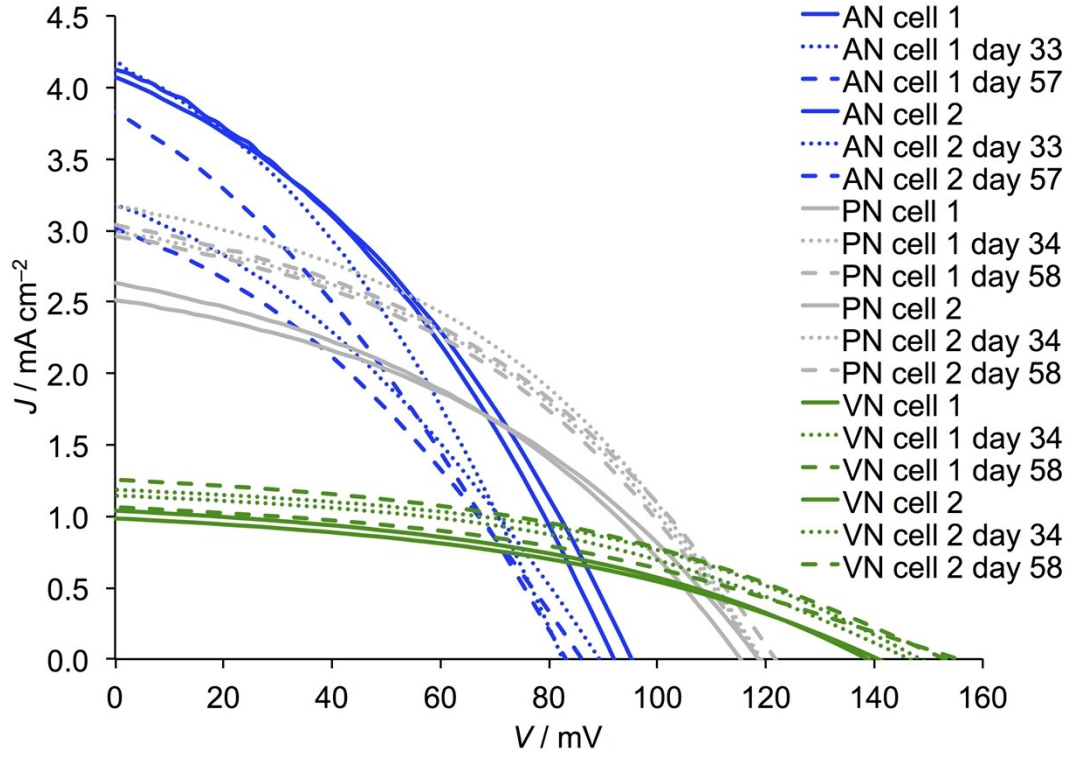

Fig. S4. *J*–*V* curves for duplicate DSCs containing commercial FTO/NiO electrodes functionalized with [Ru(bpy)$_2$(H**1**)] and electrolytes comprising I_3^-/I^- in AN, PN or VN. Measurements were made on day 0, then 33 or 34, then 57 or 58 days later. Curves for MPN are omitted for clarity (see Fig. 6).